THE FARMERS' REGISTER.

VOL. II. NOVEMBER, 1834. No. 6.

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ON THE BREEDING, REARING, FATTENING, AND GENERAL MANAGEMENT OF NEAT CATTLE.

Extracts from the last edition (1833) of the "Complete Grazier."

[Continued from page 272, Vol. II.]

On the feeding of Calves for veal.

Veal being a favorite article of diet, the fattening of calves is an object of no small importance, particularly in the vicinity of the metropolis. Hence various sorts of food and modes of treatment have been recommended; but the most effectual, and consequently the best way, is to keep them in pretty dark places, in pens, (lest they should fatigue themselves by sporting too much in the light, which would be injurious to them,) and to feed them solely on the cow's milk, with the addition of a little meal, for the last few weeks. It is also a common, and not an injudicious practice, to give them about a wine glass full of common gin or rum, mixed up in as much flour as it will moisten, in the intermediate time between their being suckled: it is made into balls, and forced down the throat; and on this treatment the animal will generally become sufficiently fat in from ten to twelve weeks: it is not desirable to keep them a day beyond the time when they are fit for the butcher, as small veal is preferred to large, if equally fat. As cleanliness is an indispensable object in fattening cattle, it should likewise be particularly attended to; for this purpose, the pens ought to be elevated at such a height from the ground that the urine may pass freely off; fresh litter should be supplied every day, in order that they may lie dry and clean; and a large chalk-stone should be suspended over the pen, so that the calves can easily lick it.* It is also a common practice to bleed them when they are four or five weeks old, and again a little time before they are killed, by which contrivance the whiteness of their flesh is supposed to be greatly increased: the quantity of blood taken is about two quarts, or more, according to the age and strength of the calf. The operation of bleeding is therefore frequently repeated by some persons, though it does not appear to be altogether necessary; as the most experienced breeders are of opinion, that it is sufficient to bleed them twice, drawing from them such a quantity at each time as their age and size will allow, without hazard of destroying the animal, and others deem it altogether superfluous.

The following mode of rearing these animals prevails chiefly in the vicinity of Abbey-Holme, in the county of Cumberland, where the calves are remarkable for their size, fatness, and fine white color; before, however, we detail the practice of the breeders of that place, it will be necessary to remark, that their stock is of various ages, in order that their plan may be carried on without interruption. For the first two or three weeks, the young calves are fed in the common way; and, at the end of that time, are conducted to a feeding-shed. Here two small stakes are driven into the ground for every calf, at the distance of ten inches or a foot from each other; the head of the animal is then put through the intermediate space, a strap or cord being passed round its head, on either side of which there is a ring, which surrounds the stake. By means of this contrivance the calf is prevented from licking itself, which habit would materially affect its health and growth, while it is not so confined as to be hindered from lying down or rising at pleasure. When the calf is reconciled to its new habitation, the Abbey-Holme farmers supply it with better food than it has been accustomed to receive. Rightly judging that the latter part of a cow's milk is more nourishing, and of a richer quality than that which is first drawn, they divide the milk according to the respective ages of the animals; invariably giving the richest part to the oldest calves: so that, as the milk may lessen or improve in quantity or quality, they can at all times, regulate their stock by diminishing or augmenting their numbers. Another circumstance peculiar to that district is, the regulation of the temperature of the feeding-sheds according to the alteration of the different seasons, so as to keep them, as nearly as possible, always at the same degree of heat.* Cleanliness is also an object of rigorous attention, the place being kept constantly dried, and supplied with a proper quantity of good litter; and, on this subject, it should be observed, that oat straw has been found to render them lousy. In case any of the animals' appetites fail, so that they do not regularly take their food, they are immediately consigned to the butcher, and their place is occupied by the next in age.

In Holland, we are informed that the calves are reared in long and narrow, but tolerably lofty, suckling houses. The pen in which the calf is kept is so narrow, that it cannot turn round, so that it can only go backwards to the end of the pen, which is also short, and forwards to the door: the house is kept in total darkness, and the pen kept perfectly clean and sweet. When the suckler comes to administer the milk, a small hole is opened, sufficiently big to admit its head to be thrust out, and which is made in the door-way; as soon as the animal perceives the light, it advances towards it, pushes out its head, which the suckler puts into the milk pail; and, being taught to drink the milk, it very soon gets fat, and much quicker than by either of our modes, where the calf is usually tied up, or is permitted to run about in an open place. The Dutch farmers hang up a piece of chalk near the door, for the animal to lick; and when the calf is about to be removed, the pen is

* Chalk is commonly supposed to assist in whitening the flesh: that idea is probably erroneous; but it has an essentially salutary effect, in correcting the acidity of the stomach, to which calves are very liable, and thus preventing the consequent scouring.

* This practice cannot be too strongly recommended. Warmth is, indeed, well known to be essential to the health, and particularly to the improvement in flesh, of all animals; but sufficient attention is not generally paid to the maintenance of an equal temperature; though, next to proper shelter, it is the point of greatest importance.

so contrived, as to height, that, when the door of the suckling-house is open, it falls down on the tail of the cart, and the animal walks into it, and is secured. The floor of the Dutch calf-pens is of lattice work, so that it always lies dry.*

The district of Strathaven, in Lanarkshire, is celebrated throughout Scotland for the excellence of its veal, and there the only plan pursued is simply feeding the calves on milk alone, without the addition of any extraneous food, or nostrums for promoting rest, and without having recourse to bleeding. They are not allowed to draw the dam, but are suckled by hand, as is usual in many parts of England, both because the quantity of milk given to the calf can be thus better ascertained and more regularly distributed, and the sucking by the teat is considered disadvantageous to the cow. The reason assigned for this is, that when the entire milk is not given to the calf, the cow retains a portion of the remainder that is taken off by hand; and that when young, the calf does not drain off the milk completely; and it is well known that the milky seerskin is diminished whenever the udder is not completely emptied.† Some of the Strathaven feeders give the milk at first sparingly, from an idea that it sharpens the appetite of the calves; but others, more naturally and with as good effect, allow a full supply from first to last. For a week or two after they are calved, they are not found to consume more than about half of a good cow's milk, but the quantity is gradually increased to as much as they can drink. A well grown calf, at four weeks old, will consume the entire milk of one cow; if thriving well, it will, in two or three weeks more, take the greatest part of the milk of two cows; and in order to bring them to the greatest degree of fatness, it is common to give those which are farthest advanced the last drawn, or richest part of the milk of three cows for two or three weeks after they are four or five weeks old. This last practice, however, is scarcely necessary, for it will generally be found that the animals will be fit for the butcher, in about six or seven weeks, without any other attention than to give them abundance of the whole milk; to keep plenty of litter under them in a place that is well aired and of moderate warmth; and to exclude the light. Some have mixed eggs, and others have put meal into the milk; but the best feeders do not approve of such admixtures, which, they say, darken the flesh, web, and lights of the animal.‡

The very intelligent writer from whom we have extracted this account, does not state the average measured quantity of milk consumed by the calves during the process of fatting; but he says, that the Strathaven farmers calculate on realizing ten shillings per week from each calf, valuing the milk at from 1¾d. to 2d. per quart; and that, many have used their milk in feeding veal when they could have sold it at these prices. If so, it is clear that either the system, or the stock, must be superior to any thing of the kind in England; for the calculation of the profit of suckling in Essex, where it is usually practised for the London market, as given in the Survey of that county, is only four shillings and sixpence per week, and although that may be under the mark, yet ten shillings would probably be at least as much above it.

Of steers and draught oxen.

A good ox for the plough should be neither too fat nor too lean; as, in the former case, he will be too lazy; and in the latter, he will be too weak and unfit for labor. His body ought to be full, joints short, legs strong, eyes full, his coat smooth and fine, and every part well put together, so that his strength may be easily seen. Another requisite is, that he answer to the goad, and be obedient to the voice; but he can only be governed by gradual use and gentle treatment. Those calves which are designed for the yoke, should not be broken-in earlier than two and a half, or three years, lest they be overstrained;* nor should that operation be deferred longer, as they will become froward, and stubborn. Their work should then be so proportioned as not to affect their growth, which continues till about their seventh year; for if this be not attended to, their value will be lessened in a greater degree than will be compensated by their labor.

The strength of this animal, when properly trained and managed, is very great, and he has patience to endure fatigue; but, being naturally slow, he must not be exerted beyond his usual pace. The only method by which success can be attained is, by patience, mildness, and even by caresses; for compulsion and ill-treatment will irritate and disgust him. Hence, great assistance will be derived from gently stroking the animal along the back, by patting him, and encouraging him with the voice, and occasionally feeding him with such aliments as are most grateful to his palate. When he has thus become familiar, his horns should be frequently tied, and, after a few days, a yoke may be put upon his neck, when he should be fastened to a plough with a tame old ox, of equal size; next, the oxen should be employed in some light work, which they may be suffered to perform easily and slowly; thus they will draw equally, and the young steer will be gradually inured to work. After working in this manner, he should be yoked with an ox of greater spirit and agility, in order that the steer may learn to quicken his pace; and, by thus frequently changing his companions, as occasion may allow, he will, in the course of the first month or six weeks of his labor, be capable of drawing with the briskest of the stock.

After a steer is thus properly trained, it will be advisable, for the future, to match such as are intended to draw in the same team, or yoke: attention being paid to their size, strength, and spirit or temper; otherwise, by being unequally matched, they will not only spoil their work, and be greatly disqualified for draught, but the slower or weaker animal of the two being urged beyond its natural powers, will inevitably receive material injury.

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* Malcolm's "Compendium of Modern Husbandry," Vol. 1. p. 354. The practice is admirably adapted for fatting calves for the butcher; for which quietude is absolutely requisite: but where the object in rearing them is to keep them, as stock, it probably will be found more conducive to their health to turn them out into a sheltered paddock or yard, only housing them at night.

† See Book II. Chap. IV. Sect. 3.

‡ Aiton's Dairy Husbandry, Chapter III. Sect. 1. p. 60.

* In Devonshire, however, they are frequently put to gentle work at two years of age.

Another circumstance of essential importance in breaking-in young oxen is, that, when first put to work, whether at the plough or in teams for draught, they be not fatigued, or overheated. Till they are thoroughly trained, therefore, it will be necessary to employ them in labor only at short intervals; to indulge them with rest during the noon-day heats of summer, and to feed them with good hay, which, in this case, is preferable to grass. In fact, while oxen are worked, they must be kept in good condition and spirits, by moderate, but wholesome sustenance. Further, on their return home from labor, it will greatly contribute to preserve their health, if their feet be well washed previously to leading them into their stalls; otherwise diseases might be generated by the filth adhering to them; while their hooves becoming soft and tender, would necessarily disable them from working on hard or stony soils. The extremes of heat and cold ought also to be carefully guarded against, as disorders not unfrequently arise from excess of either temperature; and they are peculiarly exposed to fevers and the flux, if chased, or hurried, especially in hot weather.

The following mode of training and working oxen, which has been successfully adopted in North Britain, we give in the words of the farmer by whom it is practised.

"Out of my stock of cattle," says he, "I select, when two years old, (that is, after harvest, when they are rising three,) four of my stoutest, best shaped *stots* from the field. These, to accustom with harness, I bind up in my oxen byre every night, for a week or two; and they are then taken out in pairs, and put into the plough with a pair of older trained oxen yoked before them. This keeps them steady, and prevents their running off. After being yoked in this manner two or three times, I turn them again amongst the cattle in the straw-yard, where they remain until spring. They are then three years old. I yoke them all four, after training them as above stated, in a plough by themselves, which requires a little boy to drive; and in that way they are used until four years old, when they are worked in pairs as horses, by one man only, and do the same work at ploughing; for at carting, &c., I never use them, having as many horses as do that part of my work. When used in pairs, one man works two yokings, and the cattle only one each. If, however, I had occasion for two cattle-ploughs, each pair might work well two yokings, the same as horses."

The same intelligent correspondent also remarks, in addition to the above: "if, when three years old, eight stots were worked, four and four *alternately*, it would be a great relief; and I have uniformly found that cattle *moderately worked* thrive better than those that are idle, or unemployed."*

The following system of a succession of breeding and working cattle has been recommended by that eminent agriculturist Mr. Ellman, of Glynde, in Sussex:—the numbers depending, of course, on the means or inclination of the breeder:—

14 calves; of which, nine male; eight for oxen, and one allowed for accident, or not taking to work.

14 year-olds.

14 two year olds; of which eight worked a little at two years and a half.

14 three year olds; part of which taken for cows, and others, if not good, fattened.

14 four year olds; eight worked.

14 five year olds; do.

14 six year olds; fattened.

Thus twenty-four oxen are worked in common; eight, three; eight, four; and eight five years old; and a reserve is kept for breeding cows, and accidents.*

The details of the Earl of Egremont's system, as followed to a great extent at Petworth, are as follows:—

The calves are dropped from December to the end of February; they are weaned immediately, never letting them suck at all, but the milk given for a few days as it comes from the cow. But for weaning on skim milk, they ought to fall in December, or a month before and after, and should then be kept warm by housing; and thus they will be equally forward with calves, dropt late in the spring, that ran with the cow. With the skim milk some oatmeal is given, but not till two months old, and then only because the number of calves is too great for the quantity of milk; water and oatmeal are therefore mixed with it to make it go farther. But to this, heifers with their first calves are exceptions: for they do not become good milkers if their calves are not allowed to suck for the whole season; with the second they are treated like the rest. In May the calves are turned to grass; the first winter, from the beginning of November, they are fed upon rowen, or, as it is in some places called, aftermath. The following summer they are at grass; the second winter on straw, with a turn on short rough grass: they have been tried on hay alone, but straw and grass do better. The following and every other summer on grass, and are broke-in at Christmas, being then three years old, but are only lightly worked until the spring, when their real labor begins. From this time their winter food is straw, with a ton and a half of clover hay from the beginning of January. They are previously kept on straw alone, yet are worked three days in each week.

The breed is Hereford, Sussex, Devon, and a mixed breed between Hereford and Sussex. The Herefords are the best, when pure, for the combined objects of working and fatting; but the mixture of half Hereford and Sussex are nearly equal.†

The general character of the ox is, patience and tractability, though young steers sometimes prove refractory and vicious, which, however, is in most instances the result of defective management, or of bad treatment when first broken for the yoke. When, therefore, an ox is unruly or stubborn, it will be advisable to keep him till he is hungry; and, when he has fasted long enough, he must be made to feed out of the hand. On his returning to labor he should be tied with a rope; and, if he at any time become refractory, gentle measures should be adopted, as above described, in order to bring him to work readily and quietly.

In *working oxen* to advantage, much depends on the mode of harnessing them, and the question, "whether it is most advantageous to yoke oxen by the head or by the collar?" has occasioned much

* Farmer's Magazine vol. 3 p. 450.

* See Agricultural Survey of Sussex, p. 261.

† Ibid 263.

discussion, and is even yet undetermined. The prejudice throughout Great Britain is, generally speaking, decidedly in favor of the collar; but throughout Spain and Portugal, where oxen are the only animals employed in agricultural labor, whether of road or field draught, they are invariably yoked by the head. The strength of the animal, indeed, lies in his neck, of the power of which, the yoke affords him all the advantage, while the collar deprives him of it, as he does not draw by the shoulders. The far greater cost and trouble of harness, than of yokes and bows, are also considerations of moment; and in summer, harness has been found an incumbrance, the ox requiring all the relief and liberty that can be given in hot weather.

In Portugal, these animals are harnessed in the following manner; a long leather strap is wrapped round the yoke, whence it passes round the lower part of the horns, and is again fastened to the yoke. By this contrivance, the heads of the oxen become more steady while performing their work, and these useful animals are rendered more tractable. In France, and in the Peninsula, oxen are yoked in a manner which is better expressed by the aid of figures than by description. Plate 1, figure 1, therefore, represents a view of the hinder part of the head and neck of these animals in the yoke, as they appear to a spectator; and figure 2 exhibits a front view of the upper part of their heads, in order to convey a more accurate idea of the mode in which the French oxen are fastened to the bow. We understand that the Earl of Shannon introduced this method of yoking oxen into Ireland, and that two oxen thus harnessed were enabled, with great ease, to draw the enormous weight of three tons.

The advocates for the collar insist upon the advantages of single-ox-carts; and of ploughing with the team at length, by which, as they walk in the furrow, the land is not so much subject to be poached as when they are yoked abreast. They affirm, also, that the pace is quicker in harness; and that the animal works with greater ease. But their opponents allege, that oxen are more advantageously worked in couples than singly, inasmuch as that, being nearer to the draught, they possess greater power over it than when drawing at length: they consider the additional expense occasioned by a double number of one-ox-carts and drivers, as more than counterbalanced by any advantage, even if any were admitted, in their use; and they deny that the animal works either quicker or with greater ease.

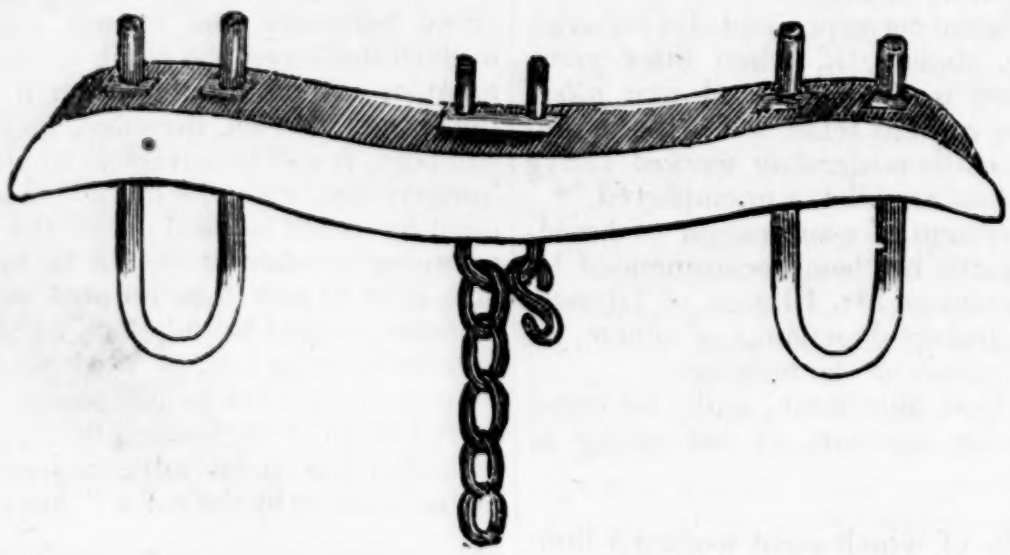
It would be endless to detail the various comparative trials that have been published on this long contested subject; and it may be deemed sufficient to state the result of two, made, some years ago, in Sussex; where, from oxen being extensively used, the dispute has excited more than common interest.

In order to decide the respective merits of the two methods, it was agreed, that an acre of land should be ploughed by two teams, the one of six oxen in double yokes, the other of four oxen in collars; and then, again, with four oxen in single yokes, against four in collars. In the first trial, the six in yoke beat the four in collar easily; and in the second, there were only three minutes difference. The work was equally well performed; but the ploughing must have been very light, as the last match was completed in four hours and ten minutes.*

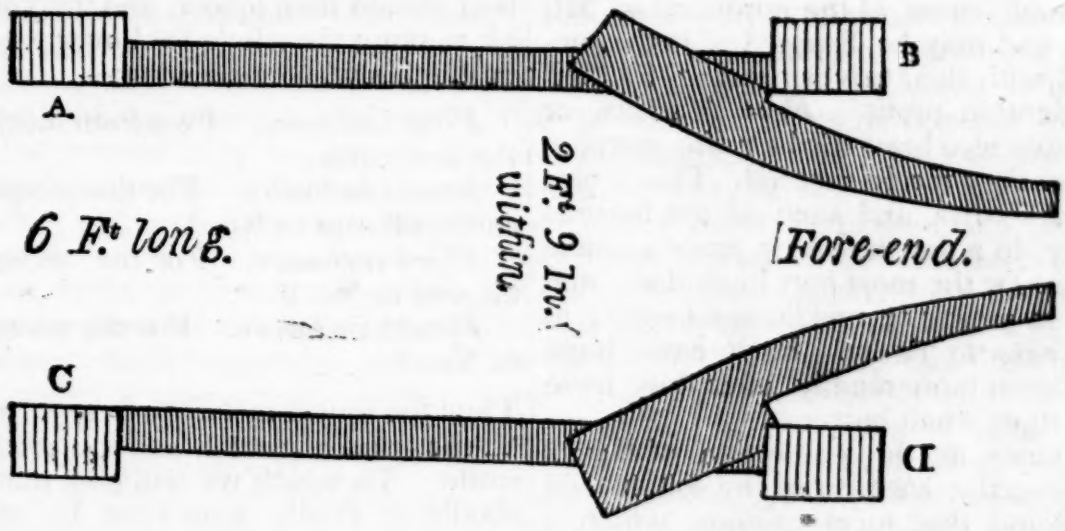
So far as this experiment may be considered decisive, it re-established the equality of the teams; but had it been tried by more severe labor, or on hilly ground, it might have proved different; and in steep ascents, more particularly, the yoke would probably have been found best adapted to the animal. It is a prevalent idea in England, that oxen are unfit for draught in hilly countries; but a large portion of the Peninsula is mountainous, and there they draw heavy weights in carts of a very rude construction. Being worked in yokes, they possess the power of preserving the line of draught, by lowering the head according to the inclination of the ground, an advantage which is lost in the application of the collar; and their chief strength is, besides, supposed to depend on the joint power of the neck and the base of the horn.

Lord Egremont has also worked his cattle each way, at Petworth, in both road and field labor, and his Lordship's experience confirms the opinion in favor of the old Sussex yoke, of which the following is a figure.

* See Agricultural Survey of Sussex, p. 243.



Connected with the subject of draught is another, which has only received, of late years, that attention which it required, viz. the *shoeing of oxen;* a necessary operation, which, when carefully executed, will not only conduce to the animal's comfort and health, but also to the farmer's profit; as he will thus be enabled to draw both with greater speed and with superior effect. According to the common practice, the animal is first *cast*, or thrown, and his legs bound together in the usual manner; he is then forced nearly upon his back, and his feet are hoisted up to a convenient height by means of a forked pole, the forked end taking the bandage that binds the feet, while the opposite end is firmly fixed in the sward upon which they are thrown: the farrier then proceeds to affix the shoes in a manner similar to that practised on horses. By this simple contrivance, the operation acquires great firmness, steadiness, and convenience; but it is attended with disadvantage, as accidents sometimes occur in the operation of casting: the other oxen are also apt to become unruly on seeing their companions roughly treated, and thus many valuable cattle are often rendered completely useless. To obviate such accidents, an ingenious machine of great simplicity has been long in use at the late Mr. Bakewell's farm at Dishley. It merely consists of four posts A, B, C, D, fixed firmly in the ground with strong side-rails, thus:—



The animal being led in, is confined by four broad straps going over the back and under the belly; the two projecting benches are hollowed on the top, for laying on the fore legs one at a time; the hind legs are severally held out, when wanted, by a long wooden lever; and thus the shoes are applied without any possibility of injuring the beast. It has, indeed, been suggested, (and we think the plan might be easily carried into effect,) that if calves, intended to be reared for work, were accustomed, while young, to have their feet taken up, and their hoofs beaten with a hammer, and this practice repeated during the winter, while the steers are in the yards, they might afterwards be shod in the same manner and with equal facility as horses.*

Of grazing neat cattle.

The feeding and fattening of cattle, whether for labor or for sale, is the most important in the whole economy of the grass farm: hence the farmer should previously consider the *nature* and *fertility* of his *pastures*, and the extent and quality of his other resources; and, according to these, he ought to regulate his system of *grazing*, *soiling*, or *stall-feeding*. He should then select those beasts only which evince the most *thriving disposition to fatten with the least consumption of food*, and depasture them upon such lands as are best calculated for the respective breeds; especially taking care not to bring cattle from rich to inferior soils, but, wherever it is practicable, to choose them from lands of nearly the same quality as those destined for their reception: beside which precautions, it is proper in all situations which are not provided with wholesome water, to avoid selecting cattle from those districts where it abounds in a state of purity.

The introductory view of breeds prefixed to this work, will probably supply some hints for enabling the farmer to decide what sort of stock is calculated for peculiar situations; in addition to which we would observe, generally, from the practice of the most eminent graziers, that the larger beasts are preferable for the more luxuriant pastures; while, in such as are less rich, small stock answer best. Thus, a grazier who has fertile meadow, or deep marsh, may select his beasts as large as he can find them; but he who has only indifferent grass, should take care to proportion the size of his beasts to the goodness of their pasture; for it is preferable to have cattle rather too small than too large for the quality of the land. Hence we find, that in the rich grazing counties of Durham and Lincoln, large breeds are chosen, while in Norfolk and Suffolk, the kyloes and galloways are fattened preferably to any other breeds, not alone on account of their superior kindness, and the excellence of their flesh, but from the stock being better suited to the lightness of the soil. Next to these, in the esteem of salesmen, is the dark red variety of the Devonshire sort, which chiefly prevails in the counties of Leicester, Oxford, Somerset, and Warwick; to these may be added the Glamorgan, Hereford, and Suffolk polled breeds of cattle, all of which are eminently profitable in particular situations. But, in order to carry on the grazing of cattle with effect, it is necessary that the grazier form a complete plan, or system, and proceed regularly therein, deviating from it in those instances only which obviously tend to improve his course, and ultimately to increase his profits.

* On the working and shoeing of cattle, see Chap. VIII. No. 5 on "British Husbandry," in the Farmer's Series of the Library of Useful Knowledge.

With regard to the species of cattle best calculated for grazing, spayed heifers and oxen are certainly superior to any other stock; the former, indeed, are of less frequent occurrence, though they fatten with more expedition. Many graziers consider heifers more kindly in their disposition to feed than steers; particularly when they have already had a calf; and Mr. Honeybourne, the respectable successor of Bakewell, at Dishley, is of opinion that they are superior to oxen for fatting at any age, and that they will produce a greater weight of beef per acre.* Wintering heifers in calf, in some grazing districts termed *incalvers*, may also be advantageously fattened, if attention be paid to selection, and the beasts are well fed during the winter, on rich succulent crops; they are occasionally sold for small sums at the autumnal or Michaelmas fairs, and may be disposed of in the succeeding spring, with their calves running by their side, to considerable profit. *Free Martins*, or barren cows, have also been tried for the purpose of fattening, but they rarely succeed. This is also the case with old cows, and such as are become dry, which may, in a few instances, prove a source of profit, but are for the most part hazardous, and much inferior to young or middle-aged stock, in point of *kindliness to fatten*. Such cows have been found to fatten more readily after they have taken the bull, than when barren.

In stocking lands, as the proportion of beasts must depend upon the fertility of the soil, it will generally be found that local custom, which is usually the result of experience, will afford the surest guide. In the counties of Somerset and Devon, one acre, or one acre and a half of the richer kinds of land, are allotted to one ox, to which a sheep is sometimes added: but fertile as those districts are, they are surpassed by the richer grounds of Lincolnshire, the best of which will support one ox and fourteen large sheep on two acres during the whole summer, and five sheep on a similar space of land in the winter, or *sixteen* sheep on one *acre* throughout the summer. Instances have indeed occurred, in which *one hundred and ten* Lincolnshire sheep, and *fifteen* large bullocks of the same breed, have been fattened on *fifteen* acres, the last-mentioned animals having been put to spring grass out of the straw-yard, and fattened to the weight of 1,130 pounds by the ensuing Michaelmas.

In order to graze cattle to advantage, it will be profitable to change them from one pasture to another, beginning with the most inferior grass, and gradually removing them into the best. By this expedient, as cattle delight in variety, they will cull the uppermost or choicest part of the grass, and by filling themselves quickly, as well as by lying down much, they will rapidly advance towards a proper state of fatness; while the grass, which is thus left, may be fed off with laboring cattle, and lastly with sheep. Hence it will be advisable to have several inclosures, well fenced and sheltered, and abundantly supplied with wholesome water. Respecting the best size for such inclosures, there is a difference of opinion; from ten to fifteen or twenty acres, perhaps, is the most appropriate; though, if any be of a greater extent than this, they may be divided by a strong, but temporary fence for this purpose. Their size, however, should be various, as small ones are preferable in winter, and larger ones during the summer. Thus the greatest and strongest cattle will be separated from the weaker ones; for, if cattle of various sizes are indiscriminately mingled together, the more powerful beasts will master the others, driving them from place to place, and trampling upon or wasting more food than they can eat.

To prevent these inconveniences, and also to stock the land to the greatest advantage, some intelligent graziers recommend the following method of feeding and fattening cattle. Suppose there are four inclosures, one ought to be kept perfectly free from stock till the grass is in its full growth, when the prime, or fattening cattle should be put into it, that they may get the best food; the second best should then follow, and the young stock after all, making the whole feed over the four inclosures in the following succession:—

First inclosure. Free from stock, till ready for the best cattle.

Second inclosure. For the reception of the best cattle, till sent to No. 1.

Third inclosure. For the second best cattle, till sent to No. 2.

Fourth inclosure. For the young cattle till sent to No. 3.

Thus the fourth inclosure is kept free from stock till the grass is got up, and it is ready for the prime cattle. To which we will add, that the inclosures should be finally gone over by store sheep; by which they will be eaten down to a close and even sward, to the great benefit of the aftergrowth.

It will also be of service to erect *rubbing-posts* in different parts of the various inclosures, where stock are feeding, as such posts keep the cattle from the fences, and furnish them, no doubt, with an agreeable, and perhaps, a salutary amusement. Some Norfolk farmers draw the crown of a tree, with the lower part of the boughs left on it, into the middle of the close; this is less trouble than putting down a post, is easily rolled and removed, and seems to be still more agreeable to the cattle.*

Before we proceed to discuss the other branches connected with the grazing of cattle, it will not be altogether irrelevant to state a few particulars concerning the peculiar practice, or management of some of the most eminent graziers.

Thus, some farmers purchase *heifers*, and other lean stock, from the month of March or April, to the month of May, and turn them in upon the meadows and pastures as early as possible. Here the beasts become completely fat on the *grass-feed* towards the close of October, or the commencement of November, or perhaps later in the year, according to their kindliness of disposition in taking on fat. In the county of Middlesex, this method is applied with uncommon success, on hay-farms. The graziers in that county purchase small cattle, which are in pretty good condition, as early in the autumnal quarter as the *rowen lattermath*, or after-grass, is ready; into this the beasts are turned, and are sold to considerable advantage about the end of October, or early in the ensuing month of November.

There is another mode practised in some graz-

* See the Agricultural Survey of Leicester, p. 232.

* Marshall's Rural Economy of Norfolk, Vol. II. p. 115, 2nd Edit.

ing districts, where the lean stock are purchased at various periods and of different sizes, so that, as some become fat sooner than others, they may be sent to market in succession. According to the plan of these graziers, the cattle are sometimes kept throughout *two* winters, during the first of which they are not at *full-keep*, but in the following summer they are turned into good grass, and are fattened off in the second winter with the best and most forcing food the farmer possesses. The more common system, however, consists in buying small cattle as early in the spring as the grass affords a good bite, when they are allowed one summer's grass, and are stall-fattened in the ensuing winter.

With regard to the management of pasture grounds, it may be observed, that those which are laid or allowed to rest at Candlemas, may be grazed in the following May; such as are laid in May, may be grazed at Midsummer; those to which rest is given at that season may be grazed at Lammas; while such as are laid at Lammas may be grazed in October, and generally throughout the succeeding winter.

In the grazing of cattle, a variety of circumstances will claim the farmer's attention, in order to conduct his business with regularity, or with profit. Hence he ought to take especial care not to turn his stock out into the pastures in the spring, before there is a *full bite*, or the grass has obtained a sufficient degree of length and maturity; for neat cattle, whose tongues chiefly enable them to collect the food, neither can nor will bite near the ground, unless they are compelled by extreme hunger, in which case, it is obvious they cannot enjoy their feed, and consequently cannot thrive in proportion.

Where beasts are turned into fields, consisting either of clover entirely, or of a mixture of natural and artificial grasses, great circumspection is required, to see that they do not eat so eagerly, or to such excess, as to become blown or hoven, an affection to which cows are more peculiarly liable than any other neat cattle. That disorder, however, may be prevented either by feeding the animals so as to gratify the cravings of appetite before they are turned into the pasture, or by constantly moving them about the field for a few hours after they have been turned in, that the first *ball* at least may sink into their maw before the next be deposited. Should they, notwithstanding, be attacked with that dangerous swelling, they may be relieved by adopting the remedies pointed out in Book VI. Chap. 1.

Although the various grasses of which a pasture is composed ripen at different periods, yet the sward usually attains its greatest luxuriance about Midsummer; and from that time to Lammas it possesses a peculiar sweetness, so that stock may be allowed, during the intervening period, to bite somewhat nearer to the ground. It will, however, be necessary to remove fatting cattle, (as already intimated,) from time to time, into fresh grounds; so that by taking the uppermost and choicest part of the grass, they may feed both expeditiously and thoroughly. The grass left behind them may be fed off first with laboring cattle, and afterwards with sheep. This last-mentioned point cannot be too minutely regarded; for, if cattle be in want, they will lose more flesh in one day than they can possibly gain or recover in three.

Such pastures as lie in fenny or other situations which retain moisture for a long time, ought to be fed off as early as possible, lest sudden or long-continued rains descend, which will not only render the juices of the grass thin and watery, and ultimately putrescent, but which will also materially affect the health and constitution of the animals. To prevent the losses consequent on such accidents, it will therefore be indispensably necessary, daily and attentively to inspect the grazing stock; and if any beasts appear to be affected by eating wet grass, they should be immediately conducted into dry shelter, and fed with hay or straw; or, if they cannot be conveniently removed, they must be driven to the driest spot, and there supplied with *sweet* cut grass and dry fodder.

The *hard* or *light stocking of pasture ground* is a point on which many experienced graziers are by no means agreed. By some it is contended, that pastures ought to be stocked very lightly; alleging, that although much of the produce is thus allowed to run to seed, which the cattle will not eat, and which is consequently trodden under foot, where it is rotted by rain, and thus wasted; yet experience, say the advocates for *light stocking*, evinces that a greater profit will, upon the whole, be thence derived than by any other practice, on account of the superior thriving of the animals.

By others, on the contrary, it is maintained, that the practice of light stocking is highly to be condemned; because it not only tends gradually to diminish its produce, but also to encourage the growth of coarse and unprofitable grasses, which materially deteriorate the pastures; and that the *hard stocking* of grass lands, particularly those of a rich quality, is an indispensable requisite of good management. It must be confessed, that the superior fertility of the hard-stocked Lincolnshire pastures tends greatly to corroborate these assertions, which receive further support from the practice of the most experienced graziers in Romney Marsh. It is recommended by a third party, (whose opinion, perhaps, approximates more nearly to the truth,) that *mixed-stock* should be always kept on the same field; for the foul grass, produced by the dung of some animals, will be consumed by others; and as it is well known that different species of cattle prefer different kinds of grass, there is an evident advantage in this practice.

In every field, numerous plants spontaneously spring up, some of which are disliked by one class of animals, while they are eaten by others; and some of which plants, though eaten with avidity at a particular period of their growth, are entirely rejected by the same beasts at another period of their age. Hence, they say, it becomes necessary, not only to have a great variety of cattle in the same pasture, but also a very particular attention is required to augment or diminish the proportions of some of these classes of animals at certain periods of the year; otherwise some part of the produce will run to waste, unless indeed it be hard stocked to such a degree as to retard their thriving.

On this it is, however, to be observed, that where a great variety of animals are allowed to go at large in the same pasture, they rarely feed with that tranquillity which is necessary to ensure thriving. It frequently happens that one class, or sort of beasts, wishes to feed or to play, while others are inclined to rest; thus they mutually tease and

disturb each other; and this inconvenience is materially augmented, if any sort of *penning*, or confinement, be attempted. Hence it is obvious, that the practice of intermixing various kinds of live stock is productive of evils, which are, in many instances, greater than those resulting from the waste of food intended to be prevented by this practice. There is, indeed, no doubt but that by *hard stocking*, the grass will be kept short, and will consequently be more palateable in general to the animals that eat it, than if it were allowed to grow to a great length; and that even unpleasant patches may thus be consumed; but as animals, which are to be fattened, must not only have *sweet* food, but also an *abundant bite* at all times, in order to bring them forward in a kindly manner, it appears scarcely possible to unite both these advantages with an indiscriminate mixture of stock: it may, therefore, be generally prudent to confine the practice to neat cattle and sheep.

Independently of remedying the inconveniences above specified, a variety of circumstances concur to prove, that the practice of *soiling*, or feeding cattle during the summer with different green and succulent vegetables, which are cut and carried to them; and of *stall-feeding* them in the winter season with dry fodder, in conjunction with various nutritive roots, will in general be highly economical. The former of these modes, in particular, has been but little used till within a few years, and has not been treated with that attention which its importance deserves: hence, we trust, it will neither be inconsistent with the nature of the present work, nor altogether uninteresting to those who are sedulously aiming at the improvement of their lands, if we consider the subjects of soiling and stall-feeding in the following points of view.

[To be continued.]

ON THE APPLICATION OF STEAM TO PURPOSES OF HUSBANDRY

From the [British] Quarterly Journal of Agriculture, of 1834.

[The article from which the following extracts are taken is not such as might be inferred from its title. It is neither an account of any practical application of steam power to the uses of agriculture, nor an argument in favor of the practicability of any such plans. But assuming it as unquestionable that steam power may be so applied, the application and its effects are treated of as affecting the general and political state of agriculture in England. The statements given of the actual use of steam power to propel carriages on common roads, will be found interesting; and still more so, is the admission of the writer, and the grounds for the admission, that the corn laws of England *must* be repealed. The agricultural interest has heretofore clung to that system of restriction and monopoly, as if the strength and welfare, indeed the existence of the nation, depended on its maintenance—and every agricultural journal has been a mouth-piece to proclaim the absolute necessity of prohibiting the importation of foreign grain. Nor is the change of tone now exhibited in the Journal of Agriculture any evidence of a change of opinion on this subject, but merely a yielding, from necessity, to the strength of the great and increasing number of their opponents, who contend for "cheap bread," and the destruction of the corn laws. The reluctant admission that this must be conceded, coming from an organ of the party which erected and supported this system, is the strongest proof that the days of the prohibitory system in England are numbered, as well as in our own country. The progress of the knowledge of political economy among the higher classes in England, and of intelligence in general among the mass of the people, have given the death blow to the prohibitions on the corn trade. It will not be very long before England may be as much benefited by buying, as we shall be by selling to her, our cheap grain--and as soon perhaps,there will be an end to the equally impolitic and injurious restrictions imposed by our laws on the importation of foreign manufactured commodities. The oppressed portions of both nations have become too well informed to be longer deluded by the interested advocates for restrictions on trade—and are too strong to be thus oppressed, when knowing their wrongs and the sources of them. The friends of free trade may confidently expect to see the practical operation of their doctrines gradually and widely extended—and our country, and the civilized world, released from the fetters of the prohibitory system, which ignorance forged, and avarice and ambition have so long kept firmly riveted.]

At the present moment when the cry for *cheap bread* is waxing louder and louder, and the anti-corn-law party is daily increasing in numbe- and power, it may not be unimportiant to call the attention of the Highland Society, and the agriculturists of Scotland, to the great advantages which will arise from the adoption of the cheaper system of husbandry which the application of steam to general purposes of brute animal labor now renders practicable.*

During the last twelve months, rapid advancement has been made in locomotive science, and a great change has been effected in its favor upon the public mind. The problem in mechanics, which the whole scientific world clung to as an axiomatic truth, that the periphery of a wheel had not sufficient hold upon the ground to render it an available fulcrum, was experimentally exploded by Gurney, in the year 1825, and, since that time, Dance, Handcock, Smith, Ogle, Macerone, and various others, have, after surmounting personal and mechanical difficulties almost incredible, established, by numerous successful experiments, the possibility of substituting inanimate for animate power.

Without enumerating any of the various performances of those locomotive carriages, upon which, in 1831, after a patient investigation for three months, a Committee of the House of Commons arrived at the conclusion, "that sufficient evidence had been adduced to prove that they can be propelled by steam on common roads, at an average rate of ten miles per hour; that at this rate they have conveyed upwards of fourteen passengers; that their weight, including engine, fuel, water, and attendants, may be under three tons; that they can ascend and descend hills of considerable inclination, with facility and safety; that they are perfectly safe for passengers; that they are not

nuisances to the public; that they will become a speedier and cheaper mode of conveyance than carriages drawn by horses,"—it is sufficient to say that, in the month of September last, Sir Charles Dance's carriage, exclusive of stoppages, ran down to Brighton in five hours and a quarter, carrying fifteen persons, and the following day it returned in four hours and fifty-nine minutes, without any failure of the machinery, and passing on the road two of the light coaches which had started half an hour before it. In October, the success of this trip was farther corroborated by the same carriages plying for hire between Wellington Street, Strand, and Greenwich, running about 250 miles during that time, through crowds of spectators, and conveying upwards of 336 passengers, without accident or impediment of any kind whatever; and, in November, that journey was made in the same carriage, upon the mail-coach line of the Holyhead Road, which enabled a commitee of experienced engineers, with the practical and circumspect Telford at their head, to report, "that there can be no doubt that, with a well constructed engine, a steam-carriage conveyance between London and Birmingham, at a velocity unattainable by horses, and limited only by safety, may be maintained, and that it is their conviction that such a project may be undertaken with great advantage to the public."

It is unnecessary to mention the various and successful exhibitions made by Mr. Handcock's steam-carriage, during the six weeks which it plied for hire during the last autumn, between the city and Paddington, and by Colonel Macerone's, during the nearly 2000 miles of trips which it has made. We are speaking of a principle, not of the particular merits of the various engines, nor of relative performances. It is sufficient, therefore, to say that so satisfied are the engineers, and scientific individuals who have taken the trouble to make themselves practically acquainted with the subject of the practicability and importance of this mode of steam communication, that companies to introduce it upon tramways are now forming for "London, Birmingham, and Holyhead," and "London Bristol, and Plymouth." The former is already so far advanced, that notice has been given to Parliament for leave to bring in a bill. Several, other companies are in agitation. In Scotland also, steam-carriages are shortly to be introduced at Edinburgh, Glasgow, Aberdeen, Dundee, &c.

These statements have been made to show that we are warranted by facts for holding that the *power* of inanimate locomotion is completely gained, and that no physical difficulties any longer exist to postpone its introduction. With regard to the *economy* of the substitution, though little definitely can be said from the data furnished by working machinery, which has been altered and patched up times without number, still the disbursements made in running the three principal steam-carriages, as detailed in the *Journal of Steam Transport*, show the most favorable case. The outlay and return upon Mr. Handcock's steam omnibus for the six weeks which it plied for hire, showed a clear gain of nearly cent. per cent.; whilst Colonel Macerone, from the expense incurred in working his carriage in trips taken collectively, amounting to about 2000 miles, calculates that even a higher profit will arise upon the capital employed. When it is considered that a tramway of granite can be laid down at comparatively a trifling expense to a railway of iron; that the tear and wear of machinery upon it will only be one-third greater than the other, whilst the charge for maintenance of road will for years, from the solidity and durability of the material, amount to nothing, it is perhaps not too much to say, after reducing fares a half, and accelerating speed to an extent limited alone by safety, that a clear profit of not less than £50 per cent. will arise upon the capital embarked in steam conveyance. * * * * * *

But though difficulties exist in the minds of agriculturists, who have not turned their attention to the subject, as to the possibility of extending steam to husbandry purposes, no difficulties exist in the opinions of many eminent machinists who have turned their attention to it. We have had conversations with several patentees, who have each assured us, that there are no practical difficulties in the case, provided there was any inducement for them to direct their skill to such a species of machinery. Mr. Phillips' getomic apparatus, the model of which we have seen, though far from being a perfect machine, is yet sufficient to show that a little farther simplification is all that is required to render it such. We are happy to say, that in our notions respecting steam-ploughing, whether as regards its practicability or importance, we are corroborated by a Fifeshire farmer, who, in a letter of the date 24th December, 1833, published in the Fife Herald, remaks, "that at present, when the ingenuity of man is upon the stretch to devise means to abridge human labor, and add to the comforts and intelligence of redundant and still increasing population—when, by our absurd laws, the manufacturer is under the necessity of giving an extravagant price for the first necessaries of life—when industry is fettered, and the growing resources of the country are circumscribed, our tenantry wasting their time and means, and crouching under the power of their proprietors, on account of a corn monopoly, I wonder it never struck some of our agriculturists that they might, like manufacturers, endeavor to under-sell their neighbors, and drive them out of the market. I know it will be said, that it is impossible—but what I am going to suggest, is a farther extension of machinery, to assist us in keeping ourselves a-head of our neighbors, and that is the application of steam to the working of ploughs. At present, it requires nearly the half of the product of a farm to pay the necessary expenses, and a great part of that goes to the keeping of horses, harness, &c. Now, if the farmer could get a steam-engine to work his ploughs, harrows, and rollers—thrash and shear his corn—cast his drains, and rid his land of large stones, he would be able to pay his present rent, although there were no corn-laws, and grain one-third cheaper than it is."

We have gone into all this detail, not because we advocate the application of steam to general locomotive purposes, merely from the love of change, without any other reason than that change is the order of the day. No, but because there are numerous weighty, and what ought to be *imperative* reasons, for the agricultural classes giving this matter their deep and serious attention. From the whole course of events, no man can be so blind as not to perceive, that upon the subject of the corn laws, the agricultural and manufacturing classes are about to come shortly into a fearful collision.

Cheap bread is a thing that our starving and oppressed people must have, either by a cheaper system of cultivation at home, or by importation of corn from abroad. The alternative is the choice between the life and the death of the State. For surely it is madness amounting in degree to theirs whom the ancients conceived were doomed to perish, to suppose that cheap bread, by a method that will ruin our domestic agriculture, will not precipitate the country into that state of social disunion, which the whole tendency of our affairs shows to be in course of progression. Now, let it not be supposed that steam has had nothing to do in maturing this condition. During the last quarter of a century, it has been applied to what may be called *physical* purposes only, *i. e.* to purposes which has materially abridged manual labor, and multiplied almost indefinitely every species of commodity, whilst it has not been applied to any one purpose that has increased human labor, or saved the consumption, and cheapened the production of food. Consequently there has been a gradual disapproximation between the necessaries and the conveniencies of life, until, after nineteen years of peace, and what ought to have proved financial recruitment, it has reached an extent which has unbalanced consumption and production, to a degree which is paralysing all commercial and agricultural transactions, fearfully increasing pauperism and crime, fomenting sedition, and threatening the peace, order, and best interests, social and civil, of society.

The extension of steam to *economic* purposes, *i. e.* to purposes which will permit the removal of brute labor, will remedy the evils arising from its partial application; for, as we have shown, it will save and cheapen food, and that by a way which, over and above its improvement of internal communication, will improve the coal trade and iron trade, those pillars upon which the prosperity of the country is said to rest, as well as every department of manual industry. Applied exclusively to physical purposes, machinery as yet has, with all its advantages, been attended by evils far from being partial. Extended further to economic purposes, the good that will follow will not be short of universal. Hitherto its abuse, that is to say its former application, alone has been pernicious; now its use, that is to say its latter application, will be commensurately beneficial. Machinery has made goods,—machinery also must make a market. The existing circumstances of society demand this, otherwise all will terminate in convulsion.

In arriving, then at the conclusion, that cheap bread of home growth, by artificial means, will alone prove an effectual remedy for our distress, we are led to say so, not because we are an advocate for *cheap bread*, abstractly considered. On the contrary, it is our belief that it is bread being too cheap already, which is the main cause of the distress which is so prevalent. It is for the benefit of no class or condition in the State, as bitter experience proves, that prices should be—what they now are and have long been—unremunerative. But what we contend for is this, that as all the other producing classes in the State have artificially cheapened the cost of their respective productions, the agriculturists are bound likewise to follow their example, and cheapen theirs. At the present moment, more than two-thirds of the price of wages is spent upon the necessaries, and less than one-third upon the conveniences of life. There is not a laborer in the three kingdoms who does not feed his belly at the expense of his back. This is an evil of no trifling character, for it is one which affects the entire industry of the country; and farther it is one which, for the interest of all parties, ought to be removed without loss of time. In this way alone our agricultural consumers, instead of being cast into idleness and beggary, will have their condition improved, whilst all the other classes will be enable to doubled their use of the conveniences of life. In this way the advocates for free trade will procure the market at home, for which to obtain the privilege of searching abroad they are willing to destroy our domestic agriculture. * * * * *

No, cheap bread we must have, and cheap bread we shall have; but it is neither for our common nor individual interest that we should purchase it by the destruction of our home market. At the present moment, we pay yearly £80,000,000 for the corn which we consume. Of that sum full £30,000,000 go to support the animate brute machinery by which it is reared and transported. Here, then, is a system that requires revision—a repeal which will give us cheap bread, by a mode which will put us in all respects upon the same free trade footing as our continental rivals, besides superadding to all the outlets which our enterprise can find abroad, the best and surest of all markets, that of a new and prosperous one at home. At the present moment, twenty millions of our fellow-subjects may be said to be in the condition of non-consumers. With such a field, then, before us, as the regeneration of our domestic population, shall we omit, or postpone the opportunity which now presents itself, of achieving the formation of a community at home, who can make cheap bread at home, and be so remunerated as to consume prosperously commodities made at home?

Hankering after foreign relations instead of minding the one thing needful, to provide at home that extended consumption which should bear an adequate ratio to extended production, has been the fatal rock upon which the vessel of our common prosperity has split. Owing to this error it is, notwithstanding all our ascendency in the arts of industry, we have forced our domestic population into a condition which makes vain and desperate all *natural* aids for any purposes which are more than palliating. And now we must retrace our steps, and regenerate society by the *artificial* means which the progress of invention has at length put within our power. The possibility is now given to us to remedy in this way evils, which, situated as the country is, could not have been remedied by any other method. Shall the means then prove awanting? Already the substitution in questions has been retarded for years, from no other circumstance than want of co-operation, and if it be delayed a few years longer, that convulsion may take place, which, through the good providence of God, it seems provided to obviate. Had the application of elementary power contemplated merely a cheaper, quicker, better system of conveyance, we would not have taken up a subject which might tend only to urge it prematurely and improvidently into operation. No, but it is because the removal of brute labor will increase human labor, and cheapen food of home growth, at a moment when the want of these is threatening the peace and

stability of society, that we see a case sufficiently strong to make the nation at large take up the subject as a national measure.

In order more effectually to promote this object, and carry the project extensively into operation, a *national institution of locomotion*, unconnected with any trading company, is now in progress of being formed to promote the application of steam to general purposes of transport and husbandry, and to supply the desideratum which has long been experienced of there being no metropolitan association in connection with the various companies and local societies throughout the united kingdom, formed for the advancement of commerce and agriculture.

We need say nothing of the advantages to arise to our inland transport and navigation, from an institution which shall watch over these important interests, and hold out premiums for improvements in them; neither how beneficial, as regards agriculture, will the existence of an institution be, which will serve for the united kingdom generally the similar important purposes to what the Highland Society is effecting for Scotland.

An institution likewise which shall concentrate genius and science of the country, and where at a glance the public will be able to see all that mind can devise, and ingenuity perfect, for the advancement of our social prosperity, will not fail, if supported as it deserves, to be productive of the most important benefits to the nation. That support, as far as one portion of the union is concerned, we trust it will find in the Highland Society and people of Scotland.

When we consider how exigent is the *want* which steam applied to economic uses is commissioned to alleviate, and how reckless in its consequences, as that volcano indicates whose eruptions are now nightly visible in the farm-yards of some district or other of the country, we consider it fortunate that, if *cheap bread* be wholly unavoidable, it can now be procured in a way that makes it wholly desirable. The bane of having prices reduced by steam transport, and the antidote of providing for the same by steam husbandry, are both before our agriculturists. We cannot suppose that they will allow the one to be introduced unaccompanied by the other. In the hope that this will be the case, we cannot conclude this paper without congratulating all orders of our fellow subjects upon the bright prospects which the general application of steam to brute labor purposes opens upon us. At a moment when the resources of the country are no longer adequate to the wants of our population, "*when a restless spirit of discontent is everywhere abroad*," and cheap food of *home growth* is a *sine qua non* to an ameliorated condition, this beneficent agent steps in to accomplish what could not have been effected by any *external* process whatever. The speedy and general introduction of steam cultivation is all that is required to make cheap bread in Britain, in a way that will reduce no one to destitution in Britain. If our industrious classes must still earn and eat bread by the sweat of their brow, they shall nevertheless eat it in plenty, and in contentment. Under the social economy which the extension of steam to the purposes of animal labor will allow, it shall no longer be said that the wealthiest empire in the world is also the most wretched one, or that, with all our boasted wisdom in science and art, we are unwise in that which not rightly to know is misery and unhappiness! The better policy of the age of steam must be to make millions rich instead of the units,—to render monopoly the property of the state and not of the stock-jobber,—to comfort a thousand happy homes, instead of building up one bloated capitalist. Steam which, confined to physical purposes, hitherto has wrought such marvels, extended further to economic uses, can achieve all this, for by *home means*, equalizing the price of necessaries and conveniences, it *will adjust production and consumption;* the unbalanced condition of which alone has deranged the currency,—paralyzed transaction,—abridged industry; and, in a word, occasioned all these evils which at length have produced a nation divided into usurers and paupers, to the danger alike of the constitution, the altar, and the throne.

R. B.

DIRECTIONS FOR WORKING CAST STEEL.

From the Southern Planter.

Mr. Editor—The knowledge of the enclosed Recipes of Rules for working Cast Steel cost my father, some years ago, $20. As it may be of use to some of the mechanics among your subscribers, to whom it is not generally known, you are allowed to publish it for their benefit. J. G.

DIRECTIONS.

Take borax and melt it in an iron ladle until it will run like melted cinders or wax, then pour it into a clean iron plate; let it stand until cold, then pound it to powder, when it is fit for use.

TO MAKE ALL KINDS OF AXES.

Make the head or poll in the common way, and weld the iron firmly where the steel is to be placed; then with a thin chisel split the iron one inch deep in the middle, then heat the iron where it has been split; when hot hammer the iron with the pane of the hammer so that the edges of the iron may be thin on each side of the steel. Then the chisel should be entered once more to open the iron which should be nearly white hot; when opened, some of the powder should be put into the split on both sides; then the steel should be put into the same and the iron gently closed to it, so that the steel will keep its place until the welding heat is taken; put it loosly into the fire, heat it until the steel is red hot, sprinkle on more of the ingredients to prevent the steel from burning; turn it and let it be until a smoke arises, then it is fit for welding. Care should be taken to keep the iron clean, that no particles of coal or dust come between it and the steel. The edge of the axe should run past the teu iron, and be raised a little above a level.

RULE FOR TEMPERING TOOLS.

All tools should be heated slow and regular, for hardening, say to a dark red, or as low as will take a sufficient degree of hardiness. Take one gallon of salt to six gallons of water.—Temper your tools in this water.

FOR AN AXE.

Draw the temper to a Pigeon red, then cool it.

FOR CUTTING STONE.

Draw the temper to a deep straw color.

FOR TEMPERING COLD CHISELS.

Draw the temper from the heat of the chisel to a deep blue.

FOR TEMPERING KNIVES AND SPRINGS.

Knives temper in damp oil. Then draw the temper from the heat of a bar of iron by degrees, until you get it to a deep blue. Springs are to be tempered in oil, then to be oiled over, and the oil burnt off three different times over the blaze of the fire.

FLAGG'S SHINGLE MACHINE.

A machine for riving and drawing shingles, has been recently brought into use in New York of which the inventor makes the following statement in the last New York Farmer.

It is one of the greatest labor saving machines in this country; it performs its work to great perfection, and at a rate almost incredible to all who have not seen it. It is very simple in its construction, and not liable to get out of order. By this machine sixty shingles are made from the bolt or block in one minute, being one a second, and more perfect than can be made with a frow and drawing knife, as they are usually made. The shingles are of a true taper from butt to point, and can be shaved to any given thickness. Any timber that can be split with a frow can be worked with this machine: pine, cypress, cedar, chestnut, oak, ash, hemlock, or any timber that will rive or split.

ON THE GENERATION OF INSECTS.

From Insect Transformations in the Library of Entertaining Knowledge.

It was universally believed by the ancient philosophers, that maggots, flies, and other insects, were generated from putrifying substances. This opinion continues to be held by uninformed persons among ourselves;—though it would be equally correct to maintain, that a flight of vultures had been generated by the dead carcass which they may be seen devouring, or a flock of sheep from the grass-field in which they graze. Another opinion, perhaps still more generally diffused, is that caterpillars, aphides, and other garden insects which destroy the leaves of plants, are generated, propagated, or, at least, spread about by certain winds or states of the air, mysteriously and indefinitely termed *blight*. The latter belief is, probably, not so easy of immediate refutation as the former;—but, as we shall endeavor to show, it seems to us to be equally erroneous.

The small size of insects renders it somewhat easy to pass off fanciful opinions regarding them, since it is difficult for common observers to detect mistakes; but similar notions have been entertained by writers of no mean reputation, respecting even the larger animals. The celebrated Kircher, for example, one of the most learned men of the seventeenth century, goes so far as to give the following singular recipe for the manufacture of snakes:—

"Take some snakes," says he, "of whatever kind you want, roast them, and cut them in small pieces, and sow those pieces in an oleaginous soil; then, from day to day, sprinkle them lightly with water from a watering-pot, taking care that the piece of ground be exposed to the spring sun, and in eight days you will see the earth strewn with little worms, which, being nourished with milk diluted with water, will gradually increase in size till they take the form of perfect serpents. This," he subjoins with great simplicity, "I learned from having found in the country the carcass of a serpent covered with worms, some small, others larger, and others again that had evidently taken the form of serpents. It was still more marvellous to remark, that among these little snakes, and mixed as it were with them, were certain flies, which I should take to be engendered from that substance which constitutes the aliment of the snakes*."

Kircher's more shrewd and less fanciful correspondent, Redi, determined to prove this singular recipe before he trusted to the authority of his friend. "Moved," he says, "by the authentic testimony of this most learned writer, I have frequently tried the experiment, but I could never witness the generation of those blessed snakelets made to hand†." But though Redi could not, in this way, produce a brood of snakes, his experiments furnished an abundant progeny of maggots, —the same, unquestionably, that the imagination of Kircher had magnified into young snakes,—which, being confined in a covered box, were in a short time transformed into flies, at first of a dull ash color, wrinkled, unfinished, and their wings not yet unfolded,—as is always the case with winged insects just escaped from their pupa case. In less than an hour, however, they "unfolded their wings and changed into a vivid green, marvellously brilliant"—most probably the green flesh-fly (*Musca Cæsar.* LINN.)

It is a common opinion in this country, particularly in the north, that if a horse's hair be put into the water of a spring or ditch, it will be in process of time transformed, first into a hair-worm, and afterwards into an eel. The deception, as in the instance of Kircher's snakes, arises from the close resemblance between a hair and the hair-worm (*Gordius aquaticus*, LINN.,) and between this and a young eel. This fabled transformation of hair, which we have heard maintained, even by several persons of good education, is physically impossible and absurd.

The method laid down by Virgil in his Georgics for generating a swarm of bees is precisely of the same description as the snake recipe of Kircher; and though the "Episode of Aristæus recovering his bees" has been pronounced to be "perhaps the finest piece of poetry in the world," we must be permitted to say that it is quite fabulous and unphilosophical. The passage runs thus:—

Oft from putrid gore of cattle slain
Bees have been bred. * * * A narrow place,
And for that use contracted, first they choose,
Then more contract it, in a narrower room,
Wall'd round, and cover'd with a low built roof,
And add four windows, of a slanting light
From the four winds. A bullock then is sought,
His horns just bending in their second year;
Him, much reluctant, with o'erpow'ring force
They bind; his mouth and nostrils stop, and all
The avenues of respiration close;
And buffet him to death: his hide no wound
Receives; his batter'd entrails burst within.
Thus spent they leave him; and beneath his sides
Lay shreds of boughs, fresh lavender and thyme.
This, when soft zephyr's breeze first curls the wave,
And prattling swallows hang their nests on high.

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* Athan. Kircher, Mund. Subterran. lib. xii.

† Redi, Generat. Insectorum, edit. Amstel. 1686.

Meanwhile the juices in the tender bones
Heated ferment; and, wond'rous to behold,
Small animals, in clusters, thick are seen,
Short of their legs at first: on filmy wings,
Humming, at length they rise; and more and more
Fan the thin air; 'till, numberless as drops
Pour'd down in rain from summer clouds, they fly.
TRAPP'S VIRGIL, Georg. iv. 369.

Columella, a Roman writer on rural affairs, after directing in what manner honey is to be taken from a hive by killing the bees, says, that if the dead bees be kept till spring, and then exposed to the sun among the ashes of the fig-tree, properly pulverised, they may be restored to life.

These fancies have evidently originated from mistaking certain species of flies (*Syrphi*, *Bombylii*, &c.) for bees, which, indeed, they much resemble in general appearance, though they have only *two* wings, and *short* antennæ, while all bees have *four* wings, and *long* antennæ. Neither the flies nor the bees are produced by putrefaction;—but as the flies are found about animal bodies in a state of decomposition, the ancients fell into an error which accurate observation alone could explode. The maggots of blow-flies, as Swammerdam remarks, so often found in the carcasses of animals in summer, "somewhat resemble those produced by the eggs of bees. However ridiculous," he adds, "the opinion must appear, many great men have not been ashamed to adopt and defend it. The industrious Goedart has ventured to ascribe the origin of bees to certain dunghill worms,* and the learned De Mei joins with him in this opinion; though neither of them had any observation to ground their belief upon, but that of the external resemblance between bees and certain kinds of flies (*Syrphidæ*) produced from those worms. The mistake of such authors should teach us," he continues, "to use great caution in our determinations concerning things which we have not thoroughly examined, or at least to describe them with all the circumstances observable in them. Therefore, although this opinion of bees issuing from the carcasses of some other animals by the power of putrefaction, or by a transposition of parts, be altogether absurd, it has had, notwithstanding, many followers, who must have in a manner shut their eyes in order to embrace it. But whoever will attentively consider how many requisites there are for the due hatching of the bee's egg, and for its subsistence in the grub state cannot be at a loss for a clue to deliver himself out of that labyrinth of idle fancies and unsupported fables, which, entangled with one another like a Gordian knot, have even to this day obscured the beautiful simplicity of this part of natural history."†

Redi was by no means satisfied with the first results of his experiments upon the flesh of snakes, for several species of flies were produced, giving some countenance to the opinion of Aristotle, Pliny, Mouffet, and others, that different flesh engenders different flies, inheriting the disposition of the animal they are bred from. He accordingly tried almost every species of flesh, fish, and fowl, both raw and cooked, and soon discovered (as he could not fail to do) that the same maggots and flies were produced indiscriminately in all. This ultimately led him to ascertain that no maggots are ever generated except from eggs laid by the parent flies: for when he carefully covered up pieces of meat with silk or paper sealed down with wax, no maggots were seen; but the parent flies, attracted by the smell of the covered meat, not unfrequently laid their eggs on the outside of the paper or silk, the maggots hatched from these dying of course, for want of nourishment.

With respect to bees, it becomes even more absurd to refer their generation to putrefaction, when we consider that they uniformly manifest a peculiar antipathy to dead carcasses. This was remarked so long ago as the time of Aristotle and of Pliny;* and Varro asserts that bees never alight upon an unclean place, nor upon any thing which emits an unpleasant smell. This is strikingly exemplified in their carrying out of the hive the bodies of their companions who chance to die there; and in their covering over with propolis the bodies of snails, mice,† and other small animals which they cannot remove.‡

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It would have been well if such unfounded fancies had rested here; but philosophical theorists, both of ancient and modern times, have promulgated dreams much more extravagant. The ancients taught that the newly-formed earth (hatched as some said from an egg) clothed itself with a green down like that on young birds, and soon after men began to sprout up from the ground as we now see mushrooms do. The refined Athenians were so firmly convinced of their having originally sprung up in this manner, that they called themselves "Earth-born" (*Erichthonii,*) and wore golden tree-hoppers (*Cicadæ*) in their hair, erroneously supposing these insects to have a common origin with themselves.§ Lucretius affirms, that even in his time, when the earth was supposed to be growing too old to be reproductive, "many animals were concreted out of mud by showers and sunshine."¶

But the ancients, it would appear, had the shrewdness seldom to venture upon illustrations of their philosiphical romances by particular examples. This was reserved for the more reckless theory-builders of our own times. We find Robinet, for example, asserting that, as it was nature's chief object to make man, she began her "apprentissage," as he calls it, by forming minerals resembling the single organs of the human body, such as the brain in the fossil called Brain-stone (*Meandrina cerebriformis*, PARKINSON.)‖ Darwin, again, taking the hint from Epicurus, dreams that animals arose from a single filament or threadlet of matter, which, by its efforts to procure nour-

* The maggots of *Eristalis tenax*, FABR. *E. apiformis*, MEIGEN, and other *Syrphidæ*, well known in common sewers by their long tails, like those of rats.

† Swammerd. Book of Nature, i. 228.

* Aristotle, Hist. Animal. ix. 40. Pliny says, "Omnes carne vescuntur, contra quam apes, quæ nullum corpus attingnut.

† Huish on Bees, p. 100.

‡ Insect Architecture, p. 109.

§ The Cicadæ do not deposite their eggs in the earth, but on trees, &c. See *Insect Architecture*, chap. vii.

¶ Multaque nunc etiam existunt animalia terris,
Imbribus et calido solis concreta vapore.
De Nat. Rer. v. 795.

‖ Robinet, Consid. Philosophiques de la Gradation Naturelle des Formes de l'Etre. Paris, 1768.

ishment, lengthened out parts of its body into arms and other members. For example, after this filament had improved itself into an oyster, and been by chance left dry by the ebbing of the tide, its efforts to reach the water again expanded the parts nearest to the sea into arms and legs. If it tried to rise from its native rocks, the efforts produced wings, and it became an insect, which in due course of time improved itself by fresh efforts till it became a bird, the more perfect members being always hereditarily transmitted to the progeny. The different forms of the bills of birds, whether hooked, broad, or long, were, he says, gradually acquired by the perpetual endeavors of the creatures to supply their wants. The long-legged water-fowl (*Grallatores*, VIGORS) in this way acquired length of legs sufficient to elevate their bodies above the water in which they waded. "A proboscis," he says, "of admirable structure has thus been acquired by the bee, the moth, and the humming-bird, for the purpose of plundering the nectaries of flowers."* Lamarck, an eminent French naturalist, recently deceased, adopted the same visions; and, among other illustrations of a similar cast, he tells us that the giraffe acquired its long neck by its efforts to browse on the high branches of trees, which, after the lapse of a few thousand years, it successfully accomplished.

Theories like the preceding all originate in the endeavors of human ingenuity to trace the operations of nature farther than ascertained facts will warrant; and the necessary blanks in such a system, which presupposes much that cannot be explained, are filled up by the imagination. This inability to trace the origin of minute plants and insects led to the doctrine of what is called spontaneous or equivocal generation, of which the fancies abovementioned are some of the prominent branches. The experiments of Redi on the hatching of insects from eggs, which were published at Florence in 1668, first brought discredit upon this doctrine, though it had always a few eminent disciples. At present it is maintained by a considerable number of distinguished naturalists, such as Blumenbach, Cuvier, Bory de St. Vincent, R. Brown, &c. "The notion of spontaneous generation," says Bory, "is at first revolting to a rational mind, but it is, notwithstanding, demonstrable by the microscope. The fact is averred: Muller has seen it, I have seen it, and twenty other observers have seen it: the Pandorinia exhibit it every instant.†" These pandorinia he elsewhere describes as probably nothing more than "animated scions of Zoocarpæ" (propagules animés des Zoocarpes.‡) It would be unprofitable to go into any lengthened discussion upon this mysterious subject; and we have great doubts whether the ocular demonstration by the microscope would succeed except in the hands of a disciple of the school. Even with naturalists, whose business it is to deal with facts, the reason is often wonderfully influenced by the imagination.

But the question immediately before us happily does not involve these recondite discussions; for if even pandorinia and other animalcules were proved beyond a doubt to originate in the play of chemical affinities or galvanic actions—(a more refined process, it must be confessed, than Kircher's chopped snakes,) it would not effect our doctrine that all insects are hatched from eggs: for no natualists of the present day classes such animalcules among insects. Leaving animalcules and zoophytes, therefore, out of the question, we have only to examine such branches of the theory of spontaneous generation as seems to involve the propagation of genuine insects,—like the fancies about putrefaction which we have seen refuted.

The notion that small insects, such as aphides and the leaf-rolling caterpillars, are spread about or rather generated, by what is termed *blight* (possibly from the Belgic *blinkan*, to strike with lightning,) is almost universally believed even by the most intelligent, if they have not particularly studied the habits of insects. Mr. Main, of Chelsea, an ingenious and well-informed gardener and naturalist, describes this as an "easterly wind, attended by a blue mist. The latter is called a blight, and many people imagine that the aphides are wafted through the air by this same mist.*" "The farmer," says Keith, "supposes these insects are wafted to him on the east wind, while they are only generated in the extravasated juices as forming a proper nidus for their eggs.†" A more detailed account, however, is given by the late Dr. Mason Good, and as he speaks in part from personal observation, and was not only one of the most learned men of his time, but an excellent general naturalist, his testimony merits every attention:—

"That the atmosphere," says Dr. Good, "is freighted with myriads of insect eggs that elude our senses, and that such eggs, when they meet with a proper bed are hatched in few hours into a perfect form, is clear to any one who has attended to the rapid and wonderful effects of what, in common language, is called a blight upon plantations and gardens. I have seen, as probably many who read this work have also, a hop-ground completely overrun and desolated by the *aphis humuli*, or hop greenlouse, within twelve hours after a honey-dew (which is a peculiar haze or mist loaded with poisonous miasm) has slowly swept through the plantation, and stimulated the leaves of the hop to the morbid secretion of a saccharine and viscid juice, which, while it destroys the young shoots by exhaustion, renders them a favorite resort for this insect, and a cherishing nidus for myriads of little dots that are its eggs. The latter are hatched within eight and forty hours after their deposite, and succeeded by hosts of other eggs of the same kind; or, if the blight take place in an early part of the autumn, by hosts of the young insects producted viviparously; for, in different seasons of the year, the aphis breeds both ways. Now it is highly probable that there are minute eggs, or ovula, of innumerable kinds of animalcules floating by myriads of myriads through the atmosphere, so diminutive as to bear no larger proportion to the eggs of the aphis than these bear to those of the wren or the hedge-sparrow; protected at the same time from destruction, by the filmy integument that surrounds them, till they can meet with a proper nest for their reception, and a proper stimulating

* Darwin's Zoonomia, sect. xxxix. 3d edit. London, 1801.

†Cict. Classique d' Hist. Nat., Art. Microscopiques, p. 541.

‡Dict. Class., Art. Pandorinées.

*Loudon's Mag. of Nat. Hist. i. 180.

†Keith's Physiological Botany, ii. 486.

power to quicken them into life; and which, with respect to many of them, are only found obvious to the senses in different descriptions of animal fluids.*"

It appears to us that it can be nothing more than a fancy, which is quite unsupported by evidence, to say that the eggs of *any species* of animalcules or insects float about in the atmosphere; for, independent of their weight, (every known species being greatly heavier than air,) the parent insects of every species whose history has been accurately investigated manifest the utmost anxiety to deposite their eggs upon or near the appropriate food of the young. To commit them to the winds would be a complete dereliction of this invariable law of insect economy. But admitting for a moment this hypothesis, that the eggs of insects are diffused through the atmosphere, the circumstance must be accompanied with two conditions,—the eggs must either be dropped by the parents while on the wing, or be carried off by winds from the terrestrial substances upon which they may have been deposited.

On the supposition that the eggs are dropped by the mother insects while on the wing, we must also admit (for their is no avoiding it) that they continue to float about, unhatched, from the end of the summer till the commencement of spring, at which time only the broods make their appearance. Yet when we consider the rains, snows, and winds, to which they must be exposed for six or nine months, we think the hardiest theorist would scarcely maintain that a single egg could out-weather these vicissitudes, and continue to float in the air. It may not be out of place to remark, that the female aphides, which deposite eggs in autumn, have no wings.

Again, on the supposition that the eggs are deposited on plants, trees, or other objects, it is still more unlikely that they could be carried into the air; for, on exclusion, they are, with very few exceptions,† enveloped in an adhesive cement which glues them to the spot on which they are deposited. When eggs are deposited singly, this cement usually envelopes each with a thin coating, as in the instance of the admirable butterfly (*Vanessa Atalanta;*) but when they are placed in a group the cement is sometimes spread over the whole, as in the instance of the white satin moth (*Leucomr salicis*, STEPHENS.) This cement is evidently intended by nature (who seldom accommodates her plans to our theories) to prevent the eggs from being carried from the place selected by the mother insect for their deposition. Those eggs, therefore, which are placed on the outside of substances, have this provision for their secure attachment to the locality chosen by the instinct of the mother. But, on the contrary, the principle does not always hold in the case of those deposited in nests and excavations, and particularly as to those of ants and termites. The working ants, indeed, carry the eggs from the top to the bottom of their galleries, according as the weather is favorable or unfavorable for hatching. The laborers of the white ants (*Termites,*) again, attend their queen with the utmost care when she is laying; for as she cannot then move about, they are under the necessity of carrying off the eggs, as they are laid, to the nurseries. The extraordinary labor which this requires in the community may be understood, when, according to Smeathman, she lays 60 eggs in a minute, which will amount to 86,400 in a day, and 31,536,000 in a year. The exceptions now mentioned, however, do not in the least invalidate our general position.

Another no less remarkable circumstance is the great weight, or specific gravity, of the eggs of insects. From numerous experiments we may venture to say that those of all the species which we have tried sink rapidly in water the moment they are thrown into it, from the egg of the drinker moth (*Odonestis Potatoria*, GERMAR,) which is nearly as large as a hemp-seed, to that of the rose-plant louse (*Aphis rosæ,*) which is so small as to be barely visible to the naked eye. Some eggs of the gipsey moth (*Hypogymna dispar*, STEPHENS,) indeed, floated in water, because they were covered with down. It is well known, as we shall presently show, that the diffusion of many of the seeds of plants is accomplished by the winged down with which they are clothed; but the down upon the eggs of insects does not conduce to this end. Whether insects' eggs be naked or clothed with down, they are invariably, as far as their history has been investigated, deposited close to or upon substances capable of affording food to the young when hatched. In making experiments upon the specific gravity of eggs, it should be remembered that no infertile or unimpregnated egg will sink; for having some hundreds of these laid by different species of insects reared in our cabinet, we found, upon trial, that they uniformly floated, while those which we knew to be impregnated as uniformly sunk. A female, for example of the rose-leaf roller (*Lozotænia Rosana*, STEPHENS) was reared by us, in solitude, under an inverted wine-glass, upon the side of which she glued a patch of eggs, of course, unimpregnated: these, upon trial, all floated in water. But eggs of the same species taken from the outside of a pane of glass close to a rose-tree, all sunk in water; and it is to be fairly presumed, as the parent of the latter was in a state of freedom, that these were impregnated. We found the same distinction, indeed, to hold in the eggs of the drinker moth, the gypsey moth, and numerous other insects.*

Dr. Good's account of "honey-dew," which he describes as "a peculiar haze or mist loaded with a poisonous miasm," that stimulates "the leaves of the hop to the morbid secretion of a saccharine and viscid juice"—appears to us unsupported by facts. Linnæus,† on the contrary, who was not wedded to the meteorological theory of a miasmatous haze, ascribes the honey-dew on the hop leaves to the caterpillar of the ghost moth (*Hepialus humuli*) attacking the roots. Dr. Withering, favoring this account, recommends covering the roots with stones as a preventive; for the caterpillars, he avers, never attack wild hops which grow in stony places, because they cannot get at the roots.‡ It appears to us, however, that there can be little doubt that the sweet syrupy coating, called honey-dew, found on the leaves of the hop, is nothing

*Good's Study of Medicine, v. i., p. 339, 3d edition, London, 1829.

†Latreille, Hist. Génér., xiv., p. 342.

*J. R.

†Quoted by Keith, Phys. Bot., ii. 143.

‡Botan. Arrangement, ii., 440, 3d ed.

more than the excrement of the insect (*Aphis humuli*) whose propagation we are discussing. "The honey-dew," says Loudon, "mostly" (we believe always) "occurs after the crops have been attacked by these insects."* Sir J. E. Smith, who admits this to be the common cause of honey-dew, contends that what is found on the leaves of the beech is an exception; but he adduces no evidence at all satisfactory in proof of its being caused by unfavorable winds;† while the undoubted fact of its being the excrement of aphides in so many other instances‡ weighs strongly against him.

A novel theory of honey-dew has just been published by Mr. John Murray, who ascribes it to an electric change in the air. "Last summer," he says, "we investigated the phenomenon with great care: the weather had been parched and sultry for some weeks previous, and the honey-dew prevailed to such an extent, that the leaves of the currant, raspberry, &c., in the gardens, literally distilled from their tips a clear limped honey-dew, excreted from the plant; for the phenomenon was observable on those plants that were entirely free from aphides, and so copious was it, where these insects were found, that had their numbers been centuple they could not certainly have been the source of the supply. The question with me, however, was set at rest by applying a lens, having previously washed and dried the leaf by a sponge, for in this case the immediately excreted globules became apparent."§

In all observations upon insects, and the other minute parts of creation, it is often exceedingly difficult to distinguish between a cause and an effect. The question of the formation of honey-dew appears to us particularly liable to erroneous conclusions; and we therefore venture to mention a few circumstances which seem irreconcileable with Mr. Murray's ingenious theory. The hop fly (*Aphis humuli*,) we think, neither does, nor (for want of appropriate organs) can, feed on the honey-dew; and if it did, this feeding would prove rather beneficial than otherwise to the plant, by clearing it from the leaves whose respiratory functions it obstructs. So far from feeding on diseased plants and aphis only selects the youngest and most healthy shoots, into the tender juicy parts of which it thrusts its beak (*haustellum*,) which in some species is much longer than the body, and no more fitted for lapping honey-dew than the bill of Æsop's crane was for eating out of a shallow plate. In the experiment, tried by Mr. Murray, of wiping a leaf, might not the leaf have been previously wounded, perhaps, by the beak of some aphis, and hence the exudation of sap, not honey-dew? And may not the circumstances of his finding the honey-dew on leaves where there were no aphides be accounted for on the principle that the aphides had abandoned, as they always do, the parts covered with their ejecta, unless these fell from insects on some over-hanging branch? It is justly remarked by M. Sauvages, that they are careful to eject the honey-dew to a distance from where they may be feeding.* We have now in our study a plant of the Chinese chrysanthemum (*Anthemis Artemisiæ folia*, Willd.,) the young shoots of which have swarmed with aphides all the winter, and the leaves below are covered with honey-dew. We tried the experiment of wiping it off from a leaf, but no more was formed when it was protected by a piece of writing-paper from the aphides above; while the writing-paper became sprinkled all over with it in a few hours. By means of a lens, also, we have actually seen the aphides ejecting the honey-dew.†

The almost instantaneous appearance of these destructive insects in great numbers at the same time, is taken notice of with wonder by almost every writer. This circumstance, it must be confessed, gives considerable plausibility to the notion of their being brought by winds,—for whence, we may be asked, could they otherwise come? Simply, we reply, from the eggs deposited the preceding autumn, which, having all been laid at the same time, and exposed to the same degrees of temperature, are of course all simultaneously hatched. In the case of the aphides, also, the fecundity is almost incalculable. Réaumur proved by experiment, that one aphis may be the progenitor of 5,904,900,000 descendants during its life; and Latreille says, a female during the summer months usually produces about twenty-five a day. Réaumur further supposes, that in one year there may be twenty generations. We ourselves have counted more than a thousand aphides on a single leaf of the hop; and in seasons when they are abundant—when every hop-leaf is peopled with a similar swarm—the number of eggs laid in autumn must be, to use the words of Good, "myriads of myriads." The preservation and hatching of these eggs in the ensuing spring must, it is obvious, depend on the weather and other accidental circumstances, seldom appreciable by our most minute observations.‡

The history of other insects, erroneously referred to blighting winds, is more easily traced, from their being of a larger size than the aphides. The caterpillar, for example, of *Lozotœnia Rosana*, mentioned before, which rolls the leaf of the rose-tree, is one of this kind. It is well known as furnishing the common poetical comparison of "a worm i' the bud." Early in autumn the mother insects deposite an irregularly oval-patch of yellowish eggs, covered with a cement of the same color, sometimes upon the branches of the rose-tree, but more frequently, as we have observed, upon some smooth object contiguous. For several succcessive seasons, we have found more than one group of these eggs upon the glass panes, as well as the frame-work, of a window, beneath which a rose-tree has been trained. At present (January 1830) there are two of these groups on one pane, and three on the frame-work; and as each contains about fifty eggs, should they all be successfully hatched, two or three hundred caterpillars would at once be let loose, and, steraming down simultaneously upon the rose-tree beneath, would soon devour the greater number of its buds. As this window faces the east, the sudden appearance of the insects would make it appear not unplausible that they had been swept hither by an easterly wind.

*Encycl. of Agriculture, p. 865, s. 5444.

†Introduction to Botany, p. 189.

‡See Linn. vol. vi. and Willdenow, princ. of Botany p. 343.

§Treaties on Atmospherical Electricity, p. 147, Lond. 1830.

†Trans. Soc. Roy. de Montpellier.

*J. R. ‡J. R.

We found, during the same winter, an extraordinaty number of similar groups of the eggs of a leaf-roller (*Lozotænia Ribeana?*) on the branches of the goosberry and red-currant, in a garden at Lee. On some small trees, from two to ten groups of eggs were discovered; and as each group consisted of from thirty to fifty, a caterpillar might have been hatched for every bud. After the severity of the season was over, we had the piece of bark cut off on which these eggs were attached; and though they had been exposed on the bare branches to the intense frosts of 1829-30, they were hatched in a few days after being brought into our study. As the currant-trees were not then come into leaf, we had food to supply them with, and they refused the leaves of all other plants which we offered to them. Had they been permitted to remain on the trees till they were hatched, they would probably have not left a single leaf undevoured. For this spring, at least, these currant bushes will be safe from their attacks, and of course will set at defiance the supposed blighting winds, which no doubt will, as usual, be accused of peopling the adjacent gardens with caterpillars. It may be well to remark, that these caterpillars, when hatched, are scarcely so thick as a thread of sewing silk, and being of a greenish color, they are not readily found on the leaves, the opening buds of which they gnaw to the very core.*

It does not seem to have ever occured to those who thus speak of insectiferous winds, that they get rid of no difficulty by the supposition; for where, we may ask, is the east or any other wind to take up the insects, or eggs which it is said to drift along? The equally sudden disappearance of insects all at once, which is also popularly attributed to winds, arises from their having arrived at maturity, and fulfilled the designs of Providence, by depositing their eggs for the ensuing season, when they all die, some in a few hours, though others survive for several days, but rarely for weeks.

The sudden and simultaneous appearance of great numbers of frogs, snails, and other land animals, has given rise to the extravagant opinion that they have fallen in a shower from the clouds; and some goodly theories have been devised to account for the probable ascent of frog-spawn, and the eggs of snails, into the atmosphere by whirldwinds. The impossibility of this, in consequence of their specific gravity, is of course left out of consideration by the theorists. Our distinguished naturalist, Ray, when riding one afternoon in Berkshire, was much surprised at seeing an immense multitude of frogs crossing his path, and on looking into the adjacent fields he found that two or three acres of ground were nearly covered with them. They were all proceeding in the same direction towards some woods and ditches, and he traced them back to the side of a very large pond, which, in spawning time, he was informed, swarmed with countless numbers of frogs. He naturally concluded, therefore, that, instead of having been precipitated from the clouds, they had been bred in the pond, from which they had been invited a short time before, by a refreshing shower, to go in quest of food.† Their great numbers will appear less marvellous, when we consider that a single frog spawns, as De Montbeillard informs us, about 1300 eggs. Were it not, indeed, for their numerous enemies, and their not being fit to propagate till they are three years old, the country would soon be overrun with these reptiles. We have more than once seen a similar legion of hair-worms (*Gordii aquatici*, LINN.) in a garden at Lee, in Kent, every plant and spot of ground literally swarming with them. Their numbers, however, were easily accounted for, as a stream at the bottom of the garden abounds with them, and, like frogs, they appear to be amphibious.

*J. R.

†Ray's Wisdom of God in the Creation, p. 156.

THE LAW OF INCLOSURES.

An act, to reduce into one, the several acts for preventing trespasses; declaring what shall be deemed a lawful inclosure, &c.

1. *Be it enacted by the General Assembly*, That, if any horses, mares, cattle, hogs, sheep or goats, shall break into any grounds, being inclosed with a strong or sound fence, four feet high if made with stone, and five feet high if made with any other materials, and so close that the beasts breaking into the same could not creep through, or with an hedge two feet high, upon a ditch three feet deep, and three feet broad, or, instead of such hedge, a rail fence of two feet and a half high, the hedge or fence being so close that none of the creatures aforesaid can creep through, which shall be accounted a lawful fence: the owner of such horses, mares, cattle, hogs, sheep or goats, or any one of them, shall, for the first trespass so committed, make reparation to the party injured, for the true value of the damage he shall sustain, and for every trespass afterwards, double damages, to be recovered, with costs, in any court of record: *Provided*, That for a third offence, for any one of the beasts aforesaid breaking into such inclosures, it shall be at the election of the party injured to sue for his damages, or to kill and destroy the beasts so trespassing, without being answerable for the same.

2. And, that the condition of the fence, at the time the trespass committed, may be proved to a jury upon trial; *Be it enacted*, That, upon complaint made by the party injured, before any justice of the peace of that county wherein such trespass shall be, such justice is hereby empowered and required to issue his order without delay, to three honest house-keepers of the neighborhood, no ways related to the party injured, nor interested concerning the trespass, reciting the complaint, and requiring them to view the fence where the trespass is complained of, and to take *memorandums* of the same; and their testimony in such case shall be good evidence to the jury touching the lawfulness of the fence.

3. If any person damnified for want of such sufficient fence, shall hurt, wound, lame, kill or destoy, or cause to be hurt, wounded, lamed, killed or destroyed, by shooting, hunting with dogs, or otherwise, any of the kind or breed of horses, cattle, sheep, hogs or goats, he, she, or they so offending, shall pay and satisfy to the owner of the creature, so hurt, wounded, lamed, killed or destroyed, double damages, with costs; recoverable as aforesaid.

4. All owners of horses, mares, cattle, or other

beasts, which they know to have barked fruit trees, shall keep the same within their own fenced ground; and if any person shall take up any horse, mare, kine, or other beast, known by the owner to have barked fruit trees, and shall deliver the same to such owner, he or she shall pay the taker-up two dollars for every such beast, so taken up and delivered; recoverable with costs, before any justice of the peace of the county, wherein such beast was taken up, or the owner lives: *Provided always*, That the taker-up shall, if required, make oath before the same justice, that he took up such horse, mare, or other beast, and that no means were used by himself, or any other person, to his knowledge, to set the same at large, otherwise he shall lose the said reward.

[The sections of the law which follow the above, relate to other matters, and are therefore omitted.]

A COMMENTARY ON THE LAW OF ENCLOSURES OF VIRGINIA.

For the Farmers' Register.

The agricultural interest of Virginia is already greatly indebted to the Farmers' Register and its correspondents, for commencing and continuing to discuss and expose the evils of the existing law of enclosures—and though it may require a long time to remove all the prejudices, and mistaken opinions, (of which enough will always be found ready to support every evil system of long standing,) still there can be no doubt of the ultimate removal of this burden, which agriculture has placed on its own shoulders. The decree has gone forth for the future destruction of this law—for it cannot resist the attacks of truth, reason and right, which have commenced, and which will not cease until the object in view is attained. Nevertheless, truth and reason have yet to fight a hard battle, and will find stubborn opponents. It will therefore be necessary for those who are convinced of the necessity for a change, to exert themselves, and to expose the deformity and iniquity of our existing policy as to enclosures, in every point of view. To this end, I shall offer some comments upon those provisions of the law which have either been passed over, or but slightly touched upon, by those who have preceded me in this discussion.

The author of the piece signed *Suum Cuique*, (Farm. Reg. Vol. I, p. 396) and several others, have sufficiently exposed the great and main evil of our law of enclosures—the *principle* itself of the law, which instead of forbidding and punishing wrongful invasions of the farmer's property, requires of him to guard and protect it, or otherwise holds the aggression as justifiable and blameless. This principle, utterly adverse as it is to that of our laws in general, and of justice and the rights of property, is so important in its character and its operation, that it could not be counterbalanced, or justified, by any details or minor provisions of the law, however efficient they might be to secure the remnant of the farmer's right to the product of his land and labor, which the general principle of the law had not swept away. It is therefore not strange, that those who, in the pages of the Farmers' Register, have attacked the principle of the law, have scarcely noticed its particular features, and the utter worthlessness of even those provisions which were intended to operate as a means of restraining and punishing trespassers. This more humble task I will undertake. The law on the subject, which precedes these comments, will facilitate my references, and permit my remarks to be more concise.

To enable a farmer to recover damages, or obtain any legal redress whatever for injury, or destruction to his growing or standing crops, it is required by the law, that the field should have been enclosed at the time with a "strong and sound fence" of some one of the several kinds described, and of a specified height throughout: and that the field was so enclosed must be proved by the owner as a necessary preliminary step, before he can prosecute his claim for compensation for trespass. The trespasser (if I may dare to apply that term to one whom the law in effect *always* clears of the imputation,) has nothing to prove—the whole burden of proof lies on the sufferer. But suppose, that undaunted by difficulties, and determined to assert the few rights that the law leaves to him, he pursues the remedy offered, and calls for a survey of his fences, according to the provisions of the second section. Now in the first place, (and especially if the farmer is in Lower Virginia, and uses the perishable pine timber which is now the general resource for fencing,) no fence around a large field can be found every where "strong and sound," at twelve months old, even if it is permitted to remain so for twelve days after being built. It may be a fence abundantly good to restrain the owner's stock, or any other animals properly kept—but it is scarcely possible to avoid, from the progress of continual decay alone, some rails being found neither "strong or sound" enough to keep out a mischievous animal, who has been taught by hunger, and the habit of trespassing on neighboring fields for sustenance, to search keenly for all such defective places. But the regular progress of decay in fences, however rapid it may be, does not cause half of this particular evil. Wherever night-walking negroes, or other persons, choose to have a foot path through a field, they will certainly throw down, and keep down, some of the upper rails where they cross the fences—and all the owner's efforts we all know cannot prevent this being done. Any such defect in fences would suffice to prevent the owner's having any remedy or redress for the depredations of mischievous animals.

But suppose that the farmer has managed so well, and been so lucky, that no defect has been produced in his whole line of fence, either by decay, by storms, nor by design or carelessness of any neighbor, black or white—and that trespassing animals, notwithstanding, are found within the field, and that he is able to prove the fact: and that, on these (apparently) sure grounds, he makes complaint, according to law, before a justice of the peace, and obtains the order for the survey of the condition of his fences. These steps cannot be taken within a few hours, nor completed in secret: and even if the fences were perfectly good when the surveyors commenced their examination, the owner of the stock might secretly and safely cause gaps to be made before the survey was finished, and thus procure a condemnation of the fence. But without this, the mere fact that stock had entered the field would be enough to show that they had made the fence, by their entry, otherwise than a "lawful enclosure" at that place:

and unless the breach could be proved to be their act, its existence would serve to justify the trespass.

Even if by possibility neither this nor any of the other obstacles before named, stand in the way of the farmer's obtaining redress, there are still others that will prove sufficiently effectual. For the first offence, he is only permitted to recover the value of the actual damages sustained—and for this purpose the fact of every offence must be fully sustained by proof. Well—the farmer finds hogs in his corn field at earing time, or in his rank wheat just before it is fit to reap. That damage has been done, is unquestionable—and that unless the intruders are speedily removed, it will be enormous, is equally so—but how is it possible to establish by testimony the extent of the damage, and to fix it upon the particular animals that have produced it? The wheat field may exhibit evidence that hogs have concealed themselves under its heavy cover for at least a month, and have caused perhaps damage to the amount of $50: but how can it be proved that all this was caused by the one or more hogs found and caught at last? Besides, it is most likely that the hogs would not be secured so as to be identified, but would escape, to return and renew their attacks. If any uncertainty existed as to the identity, or the ownership of the animals—or as to whether the damage had been actually committed by them, there could be no redress obtained under the law. If, however, the farmer has a legal witness present, and that witness actually sees a hog tear down and eat six ears of corn, and he can swear to the individual hog, either by his ear marks, or from former personal acquaintance—and the survey is made, and the fence found lawful, *then* all obstacles are at length overcome, and the farmer who has suffered the trespass may recover damages to the amount of the value of *six ears of green corn:* and if (by almost a miracle) he could a second time get through all the like difficulties of proof, with the same trespassing neighbor, and convict him of a similar offence, he would receive as compensation double damages, or the value of *twelve* ears of corn. I doubt, however, whether he would be entitled to double damages, unless it was the same animal that committed the first trespass.

It is difficult to be serious in discussing the pretensions of this law to the character of being remedial, and giving compensation to the sufferer, and adequate punishment to the trespasser. In truth, its provisions offer no redress whatever: they are a solemn mockery of the claims of right and justice, in the details, no less than in the general principle of the law—and it might more truly be entitled "*an act to authorise the trespasses of live stock on the fields of neighboring proprietors, and to prevent all remedy therefor.*" Its actual operation is according to this title and character, and not according to its title in the statute book—for in more than thirty years that I have resided in a part of the country where there has never been a lack of trespassing stock, I have never heard of any resort to the law for damages, nor of any sufferer who even thought of it as a remedy. This fact alone, (and I believe it is general,) is enough to prove that the law in every particular is utterly worthless for the purposes which it *professes* to serve.

It may be asked then, "if the law is so inoperative, how does it happen that fences actually serve in most cases to protect the crops, and that all fields are not frequently depredated on by the stock of men who are willing to take any privilege that the operation or omission of the law can give?" I answer, and the truth is notorious, that it is not fear of the law that restrains such acts of such individuals, (who, thanks to God, are yet but few in number,) but the fear of public indignation, and perhaps of such damages to their trespassing stock, as are not authorised by law, but which are far more effectual. It is to the general sound moral sense of the community—to the strong perception of right and wrong, and the different effects of this on those who act uprightly or unjustly towards their neighbors, which serve more to restrain trespassers than all the protection promised by the law.

From these views of the particular provisions of the law, and its general disuse, I reach the conclusion, that the law of enclosures is in every respect inoperative—in effect, null and void—except so far as it gives up the property of some individuals to be used or destroyed by others, without the possibility of compensation being obtained, or legal punishment inflicted.

R. N.

BONE MANURE.

From Long Island Star.

This most valuable article is now sufficiently known to be in very great request by the farmers. The mill of Mr. Ogden at Red-Hook, has been at times unable to supply the demand. The mill of Mr. Hornby in New York, has 10,000 bushels on hand, which can be obtained of Mr. Childs, 63 Fulton street, Brooklyn, who informs us that the accumulation of bones in N. York is such, that 800 tons will be sent off in a few days, to manure the soil of Great Britain. Exportation of bones to England is no new thing, but we hope an increasing knowledge of their value will create a brisk demand at home.—Long Island embraces 925,000 acres, of which 587,695 are yet unimproved.

ON THRASHING MACHINES.

To the Editor of the Farmers' Register.

It being my wish to procure before the next year's harvest a portable wheat machine, I seek information through the Register for directions where to obtain the cheapest and the best. I consider that machine the best, which will thrash the most wheat in the cleanest manner—which is least liable to break, and which requires no more than the ordinary skill and care which we can command in our overseers and negroes—and which is easy of transportation and fixture.

I have a stationary machine—a wooden one upon the plan, I believe, of the Scotch machines—with which I finished thrashing a fortnight ago, the fourth crop. It was erected for me in 1831, by John Clark, of Fredericksburg. It thrashed 1014 bushels in 1831, in 9 days, being an average of 112⅔ bushels each day—102 bushels the least, 147 bushels the greatest day's work: besides wheat of indifferent quality—not thrashed very clean.

In 1832, it thrashed on the 25th of June, 158½ bushels of early wheat, of superior quality; and in August, 1477 bushels in 12 days—say 11½ days, (having began late on the first day, thrashing 40 bushels only, and finishing early on the last day,

thrashing 50 bushels)—being an average of 128½ bushels—89 bushels the least day's work, 204 bushels the greatest day's work—866 bushels being of tolerably good bearded—and 611 bushels of very fine purple straw wheat, which yielded 11 for 1—leaving little or no grain in the straw. The machine averaged 108 bushels of the bearded, and 153 of the purple straw wheat, proving incontestably the superiority of the one over the other for machines, and showing the necessity of indicating the kind of wheat when we refer to the work of wheat machines.

In 1833, it thrashed 1952 bushels in 14 days—say 12½ days, (1 day being lost by breaking of the machine, and finishing early on the last day, having thrashed only 49 bushels)—being an average of 156 bushels daily—98 bushels being the first and least day's work (except the day it broke, which was 80 bushels) and 172 the greatest day's work—162 bushels being of early wheat, 440 bushels of bearded, and 1350 of purple straw wheat—the product small and of indifferent quality—the quantity of straw very large.

In 1834, it thrashed 2300 bushels in 17 days—say 15½ days, (1½ being lost by the breaking of the machine—being an average of 148⅔ bushels per day—114 bushels being the first and least day's work (except the two days it broke when it thrashed only 34 and 68 bushels,) and 185 bushels the greatest day's work—700 being of early wheat much mixed with purple straw—63½ bushels golden chaff wheat from four sown—and the balance purple straw wheat—all of good quality.

My machine cost $170, exclusive of the shafts and main beam, and was put up by my own carpenters under the direction of Mr. Clark. It has cost me no more in three years, than a little hoop iron to line the bars of the concave. I think the machine a good one; but there are two objections to it—first, it is not portable—and secondly, the bars of the concave are liable to be broken by any hard substance which the wheat may carry in with it; but this objection might, I think, be removed by supporting the concave with strong springs which would yield to any thing less pliant than wheat straw. The draught is not too great.

There are various portable machines in use in this county. The best which I have seen, is a machine made by Wright of Frederick. It is, however, too costly, too heavy, and the draught is too great for our light mules. The same gentleman who owns "Wright's machine," has a machine made by Cockrane of Hanover, which I am disposed to prefer to all others, from the description given me; and I should be glad to see a detailed account of such machines. There are two machines made in Fredericksburg—the only difference, I believe, between them is, that the beaters and concaves of Davis's are cast—those of Ames's (Bayliss) are of wrought iron—both work with a band—the horse-power is nearly similar in both, and seems to me to be excellent—they do good work—but their durability has not yet been tested.

I hope that some of your correspondents will be induced to communicate to you the results of their experience in wheat machines. I have, perhaps, been unnecessarily minute in the account of mine.

E. T. T.

King George County, 5th Sept., 1834.

P. S. The wheat was measured after being fanned once, and the bushels *heaped*.

CALCAREOUS DEPOSITES ON PIANKITANK RIVER.

To the Editor of the Farmers' Register.

Upon the south side of Piankitank River in the upper part of Mathews County, upon my little farm, I have discovered oyster shells (or what we call marl) located in the bank of the river, which is very high, say fifty or sixty feet nearly perpendicular, and extends along the river on my land about half a mile long; the river at this place is tolerably salt and abounds with good fish and oysters. Intermixed with these shells, is a large quantity of a bluish or dark green colored mud or earth, arranged in the following order, a layer of shells running parallel with the bank about three or four feet through, while the mud takes its course in the same parallel direction, immediately below them, and claims possession of the very bottom of the bank, or surface of the river. This mud is the most unaccountable thing with me, for I know not what name properly to give to it, nor as yet can I estimate its value. Having moved here very recently, I have made no trial of it, but have a high opinion of it as a manure; and I am confirmed in this, from the fact of its having been partially tried this spring upon clover, by my friend and neighbor Mr. Jones. He applied the blue earth to parts of a clover lot, and marl to other portions of the same lot and at the same time, by way of ascertaining the different effects it might have, if any, and decides greatly in favor of the mud. He has also applied it to his field lands in small portions, and there the good effects are clearly seen. If I were to enter into a full description of this earth, I should not be able to give a perfect one. I would, however, here remark, that when taken from the bank and exposed to the air and it becomes dry, a white powder appears upon the lump; (indeed this sometimes appears upon the river shore where these deposites are found in very dry weather:) in breaking the lumps apart I discover numerous particles of transparent substances dispersed about the whole lump, which will dazzle the eye as it were in the hot sun. It approaches nearer what is called crystalized gypsum as it is described, than any thing else I know of. My friend Mr. Jones has a plenty of it, and we intend sending specimens to William and Mary for analysis, as I discover in No. 3, Vol. II, it will be gladly received there, and attended to by Mr. Rogers, who promises to give the relative value of all specimens submitted to his care. I think it necessary only to send specimens of the mud, as we know the shells above it are manure, and very fine, for they are nearly entirely decomposed, and apparently by some hidden mineral in the bank, for both shells and gypsum, if I may so call it, are over-spread with a sort of iron rust which is constantly oozing out of the bank. Nevertheless, as clear, cool and as well tasted water as I wish to use, proceeds from the bank both above and below these deposites.

If from the very imperfect and lame description, I must confess, which I have attempted here to give of these deposites, you or your many correspondents can give any hints of the probable benefits of it, it will be gladly received.

A. BILLUPS.

Mathews County, Sept. 12, 1834.

DIRECTIONS FOR MAKING OX-CARTS, AND FOR USING THEM.

For the Farmers' Register.

Essex County, September 20th, 1834.

The tongue of an ox-cart should be about fifteen feet in length, split as usual, and let into the cart axle by mortice and tenon, and confined by three-quarter inch iron pins. The axle should be rather more than seven feet in length, (I cannot say exactly, as some hubs are rather longer than others) and about six inches by four and a half, of seasoned timber, or it will spring and the friction will be very great. Saw up a hickory large enough for several. Lay off the shoulders four feet apart, neither more nor less, as this is the usual length, and if more or less, the labor of the oxen will be greatly increased, as one wheel will run in the rut that other carriages have made, and the other wheel over the uneven surface along side of the other rut. Draw a line down the middle of the broad side, (the side intended for the tongue to be up) which will leave three inches on each side of the line: lay off the diameter of the in-box from the bottom, leaving all at the shoulder to be taken off at top. The difference in the diameter of the in and out-box divide into two equal parts, and lay off one part from the bottom of the axle at the end of the length of the hub: then lay off from that the diameter of the out-box. Now the diameter of both boxes is laid off, draw a line from one to the other, and hew off bottom and top. The reason for dividing in half the difference between the size of the big and little box, and taking all off under the axle at the little box and none at the big one, is to bring the wheel perfectly plumb. After finishing the broad side of the axle turn the narrow side up, (the one that is intended for the top) and draw a line down the middle, which will leave two and a quarter inches on each side: then take the diameter of the in-box, and divide it into two equal parts; one part lay off back of the line at the shoulder, the other on the other side of the line; then lay off the length of the hub from the shoulder near which will come the linch pin, take the diameter of the out-box, and divide it into three equal parts; one part lay off back of the line at the end of the length of the hub, the other two parts lay off on the other side of the line. Now the diameter of both boxes is laid off, draw a line from one to the other, and round the squares. The reason for laying off at the little box one part behind and two before, is to make the wheel, in running, gently press to the shoulder of the axle. Were it equally divided into two parts, the wheel would be as apt to run off as on, and the consequence would be, should it pass off, there would be an open space between the hub of the wheel and the axle, into which the wheel would throw mud and dirt, which would at once sweep out the grease, and the constant and regular supply of grit would wear out boxes and axle. But what would be worse than all, it would so much increase the labor of the oxen. Inattention to making cart axles probably costs Virginia 1000 oxen annually. At best they are badly provided for, and the additional labor which this imposes upon them, they are very unable to bear, and as they become reduced in strength, the lash is applied to supply the place of strength, and thus the poor animals are murdered. An axle made in the way here recommended, requires no additional labor to overcome unnecessary friction.

The body should be made of seasoned timber to prevent it from being shaken to pieces; the sills should be three and a half by three inches, the length nine feet, and twenty inches deep in the clear; the width should be four inches greater behind than before, to facilitate the discharge of the load; and to prevent the sides from being broken by a sudden turn of the oxen, the sides should be confined by four iron rods half an inch in diameter, made with heads, taps and screws, and placed at the sides near each end—a set will last one's life. The greatest breadth of the body at the axle cannot exceed four feet, unless elevated above the hubs, which should not be the case, for the load will be constantly pressing forward and give too much weight before; if to obviate this, a piece should be put across the tongue, or nailed to the sill of the cart where it rests upon the tongue, the body is raised and of course more inconvenient to load—the centre of gravity is also raised. From experience, I think by far the better way is, to hang it with strong hooks and eyes, not in the way they are generally hung, for they have too much play, and throw the body in contact with the hubs, but to make the eyes of three-quarter inch iron, allowing as little play as possible. The shanks to those that go into the axle, should not be more than six inches long; when over long the body is inconvenient to put on and take off. Taper them a little just at the point to make them slip more easy into the axle, sink the eyes a little into the axle and let them stand up straight, not bent down. The shanks to those that go through the sills of the cart should be three-quarters of an inch square, and confined by screw and tap. Sink the eyes a little into the sills. They should be put one foot nearer the hind part of the body than the fore part, and no more, or it will give too much weight before. That mode of loading, as if the necks of oxen were stronger than the cart wheels, is a very mistaken notion: it is death to oxen. In many countries they have carriages so constructed as to give no weight. A cart-man requesting assistance to enable him to discharge his load by throwing up the body, is a proof that something is wrong and should be at once examined into. Are the hooks and eyes too far behind? Has he passed over uneven ground that has caused the load to press too much forward? Or has he loaded improperly?

The yoke should be, for common sized oxen, from four to four and a half feet in length, the holes for the bows one and a half inches in diameter, and about five inches apart, more or less, to suit the size of the oxen, and so bored as to be rather nearer at top than at bottom. The yoke should be rather round than flat between the bows, to prevent galling. The chain of the foremost oxen should not be hitched to the staple in the yoke of the tongue oxen, but to a clevice attached to the end of the tongue of the cart, which should not be nailed to the top and bottom, but to the sides: and the wooden pin under the tongue which is used to prevent the cart from running on the oxen, should be sufficiently long not to let the end of the tongue touch the ground, which will prevent the clevice from being broken loose by the dropping down of the tongue. When fixed in this way they pull much more, but cannot in any

way pull much, compared to the tongue oxen. Some farmers drive three yoke to one cart, but there is nothing gained by it. A load of grain with us for one yoke of oxen is twenty bushels, for two yoke thirty bushels; so the foremost yoke of oxen are allowed to draw only half as much as the tongue oxen; the third yoke of course would draw only in proportion without allowing any thing for the weight of the cart. They do well in hot and dry weather to walk before and kick up the dust, to suffocate those that are laboring behind, and in the winter to pick their way and jerk those behind to the right and left that are doing all the work. One yoke well kept will do more work than three poor ones, because they pull to a much greater advantage.

A marl cart body, for four oxen, should be made of light materials, and should be about six feet long, four feet two inches wide behind, three feet ten inches wide before, all outside measure, and one foot deep in the clear, and without a tail-board. Then when loaded it will hold about fifteen bushels. The hooks and eyes should be three inches nearer behind than before. For further fixtures respecting this body, see a piece written by me, and published in Vol. I, page 197, of the Farmers' Register.

EDMUND F. NOEL.

EMMONS' CHAIN-BAND HORSE-POWER.

To the Editor of the Farmers' Register.

Richmond, Va., Aug. 7, 1834.

I have noticed in your Register of May last, an inquiry respecting Emmons' chain band horse-power, advertised on the cover of a previous number of your Register, by (the proprietors of the patent right for Virginia) Messrs. Jabez Parker & H. M. Smith of this city, and expressing a desire to see a more detailed account of it from some practical mechanic—of its applicability to a horse mill, its cost, &c., as also an account of the machinery made at Mr. Jabez Parker's agricultural machine shop. And considering myself a practical mechanic, having served as an apprentice to, and followed the machine making business for the last twenty-eight years; and having travelled through, and resided in the Northern and Western States, and seen and witnessed the operation of the most of the horse-powers and other machinery now in use; and having boarded for about four months past opposite to Mr. Parker's shop, which I have very frequently visited, and noticed particularly the before mentioned horse-power, (which he occasionally uses in giving motion to a grist mill, thrashing machine and circular saw,) as well as the other kinds of machines made and sold at his shop; I therefore consider myself a competent judge of them, and in the way of duty, as called upon to answer the inquiry in your Register before mentioned, and as a friend to improvement, and to the agricultural community, I with pleasure undertake to do so.

I have not time to give a lengthy detailed account of the chain-band horse-power, nor do I think it necessary: but this much I will say, that the one Mr. Parker has in use works very well; it is the most simple in its construction; requires less horse power to do the same work; is apparently more durable, and less liable to get out of order, than any other kind of horse power that I have ever seen. It performs the same work with less horse-power or with more ease to the horses, than others, because there is little or no friction, there being no gear wheels—the motion being obtained from the chain-band winding from the whirl in the band wheel shaft into the forked ends of the levers from which the horses draw, so that the whole strength laid out by the horses, is immediately applied to turning the band wheel, without the usual loss there is in geared horse-powers by friction. This horse-power must, I think, be durable, as there is but very little wear upon any part of it, except the chain, and that, if it is kept out of the dirt and oiled, will wear a long time; and it being the same kind of chain in common use upon plantations, it is very easily mended or made anew by common blacksmiths.

Those horse-powers are light and portable, not weighing, I presume, over 800 to 1000 pounds, but may be made stationary for the same cost of portable ones, and their being but little cast iron about them, they may be easily made in any part of the country. They are well adapted to giving motion to a small grist mill, thrashing machine, cotton gin, and for all other purposes for which horse-powers are used. Mr. Parker's price for them, including a good leather band and all necessary fixtures, is $100; but, I presume, they may be built for much less, where timber and labor are low.

JOEL BARNS,
Of Cincinnati, Ohio.

SKINLESS OAT, AND NUT BEARING PINE.

To the Editor of the Farmers' Register.

Hickory Grove, Northampton County, N. C. 1st October, 1834.

In a visit to the Virginia springs during the past summer, I formed an acquaintance with a very worthy gentleman (Mr. Arthur G. Rose) from Charleston, S. C., in whom I discovered a congeniality of taste with myself in experimenting upon the rare productions of nature. In our conversations on the subject, I learnt that he had procured some of the "skinless oats," and the "nut-bearing pine," and he was kind enongh to promise me some of the seeds of both. On my return home, a short time since, I was highly gratified to find that they had safely arrived through my commission merchants in Norfolk, to whose care I requested Mr. Rose to consign them. I designed sending you a few of them, but finding in the August number of the Farmers' Register that a correspondent had sent you some of the oats, I shall herein send you six of the pine nuts, only. The nuts grow in a bur resembling a large unripe bur of our common pine, (except the color, which is the same as that of a perfectly ripe bur)—that is, the scales between which the nuts are enveloped adhere closely together. From the hardness of the nut I should infer, that it will take a considerable time to vegetate. I design planting some forthwith, both in the open ground and in a box, and also in the same way, early in the spring. Mr. Rose informs me by letter, that he has two flourishing young trees from the seed, but does not say when the seed were planted, or in what manner, or whether the bur sent me grew on one of

his trees. He says the seed were brought from Algiers. I recollect seeing some account of the nut-bearing pine, (perhaps in the "American Farmer") sent to this country by Commodore Porter from Constantinople, but whether any attempt was made to propagate it, and with what success, I have not learnt.

In speaking of the skinless oat at the springs, after Mr. Rose left, some gentleman put into my hands "Atkinson's Saturday Evening Post for the country," in which was a history of that grain; which stated that it was brought from "Chang-tang," I think, an interior province in China, to Amsterdam, and from thence to England. But the oat I have received from Mr. Rose, does not come up to the description of it given in that paper.

Whilst writing on the subject of oats, I beg leave to inquire, whether there are on James River, either above or below Richmond, a kind of oat called the winter or spring oat. A gentleman from Baltimore, who has an extensive acquaintance in Virginia, informed me that there was such an oat grown on James River or some of its waters. If I understood him correctly, I inferred that the oats were sown in the fall of the year, and were fit to cut in the spring, or at least much earlier than the common oat. I have a kind of oat known here, indifferently, by the names of the ruffled and feather oats. I think they are preferable to the common oat, but about ten days later. I divide my crop about equally between them and the common oat, which I think is an advantage. I saw but few of them growing in Virginia, and from the limited quantity, I inferred that they were either not generally known, or were considered to be inferior to the common oat.

The crops of cotton in this section of the country, wear a gloomy aspect, owing to an unprecedented drought, which caused the cotton plant to shed its forms or squares, blooms and incipient bolls, in a great degree, after the last working; succeeded by series of wet and warm weather, which produced the rot to an alarming extent, and which continues up to this time; and, I think, I am warranted in saying, that there will not be half the quantity made in this quarter, as last year. The same may be said of the corn crops, with the exception of the high fertile lands, and the alluvial bottoms of the Roanoke—the latter being subject to freshets, we feel alarm in consequence of the continued rains.

W. B. LOCKHART.

P. S. I have concluded to enclose a few of the skinless oats, for the purpose of comparing with those you have.

I find that the Chinese province of Chang-tang, or Chang-tong, is described as being a fertile region, but subject to long droughts. It lies in about the same latitude as part of North Carolina, and the adjoining, and other parts of Virginia; perhaps in the same as the whole of North Carolina and Virginia—the capital, Toi-nan-fou, being in latitude 36° 30′, north longitude 117° 25′, east.

CULTURE OF THE VINE, AND WINE-MAKING NEAR RICHMOND.

From the Richmond Enquirer.

We are happy to see the attention, which has been paid to the culture of the grape in the vicinity of Richmond. We have already noticed the exertions of Mr. John Carter—the various grapes which he has cultivated, and the wines he has made.

We have also been much gratified lately by a visit to Mr. William Anderson's vineyard. It is enriched by a variety of vines—foreign and domestic. The Catawba, the Isabella, and the Schuylkill particularly, flourish in great perfection—and the vines are this season loaded with the most delicious fruit. He will probably make three or four pipes of wine.

We have been happy to visit the vineyard of Dr. Norton, and to taste his wines. Among the various specimens of the vine, to which he has directed his attention, we saw the Catawba, the Isabella, the N. Carolina Scuppernong, but especially "the Norton's Virginia Seedling," which seems to us to possess some very fine qualities.—We understand it has been produced by his impregnating the Bland grape flower with the pollen of the genuine Burgundy grape. The new fruit has the advantage of uniting the abundant saccharine character of the Burgundy with the never-failing productiveness of the Bland. The vine is a great bearer; and when the fruit is pressed, it produces a rich, luscious wine, which resembles the Burgundy Madeira. The Doctor was also kind enough to show us his wines that had been extracted from the Catawba and the Isabella—both of which are very agreeable. But, as the three varieties are the produce of the last vintage, they of course want the benefit of age to impart to them all their excellence. These wines are the pure juice of the grape, unadulterated with any foreign spirit. The fermentation which they have passed through, has produced alcohol enough to preserve them in their strength and purity.

The Doctor has also in his vineyard, a fine reddish grape, a native of Prince Edward, which he has brought into notice. It promises to do well.

The experiment of Dr. Norton, of impregnating one grape with the pollen of another, and of raising a new vine from the seed, and then engrafting the slips on the wild vine, opens a field of discovery to the vine-dresser, to which no perceptible bounds can be assigned. It may lead to some of the finest varieties, both for the use of the table, and for the making of wine.

We confess we were sceptics before, about the art of making good Virginia wine. We are so no longer; and we congratulate our enterprising neighbors on the results which their experiments are calculated to produce.

INSECTS AND THEIR DESTROYERS.

Prince Edward, July 9th, 1834.

To the Editor of the Farmers' Register.

Worms, bugs, and other insects, do incalculable injury to the whole circle of vegetation. Scarcely a tree or plant is exempt from their ravages. Like time they hold their destructive course almost unseen, or but little observed, except in cases of general prevalence of some particular species, that carry manifest destruction wheresoever they appear. Yet it must be certain, that such infinite numbers as occupy almost every foot of the earth, must consume and injure a very large portion of its vegetable productions. Every means that can be devised to lessen their numbers, or to pre-

vent their increase, should be adopted. The increase of every innoxious animal that preys upon insects, &c., should be promoted. Birds are generally their enemies, many species of birds are very little injurious to vegetable production, and others not at all so, as bats, both leather-wing and feathered, the whole marten and swallow tribes, which prey alone on insects, and do no harm to any thing valuable to man, except the bee-eater—and these should be made the special objects of protection by the agriculturist. If you think likewise, can you not call the attention of your readers forcibly to this subject, and implore the clemency and protection of the community for the whole race of birds and other animals, which do either little or no harm to any useful production of the earth? Could not our high-minded generous Southern brethern particularly, be induced by a hint from you, to abstain from killing and eating the innocent martens that do nothing but good? And could not our own people be induced to spare the lives of the harmless highland frogs and lizards, &c. &c.

CHARLES WOODSON.

TO GIVE TO NEW CHEESE THE FLAVOR OF OLD.

From the Agricultural Journal.

If it be required to communicate to a new cheese the flavor and appearance of an old one, it may be done by the insertion in the new cheese of portions of the old one containing blue mould. The little scoop which is used in taking samples of cheese is a ready made means of performing the operation, by interchanging ten or a dozen of the rolls which it extracts, and placing them so as to disseminate the germ of the blue mould all over the cheese. A new Stilton cheese treated in this way, and well covered up from the air for a few weeks, becomes thoroughly impregnated with the mould, and generally with a flavor hardly to be distinguished from the old one. I have sometimes treated half a Lancashire cheese in this way, and have left the other half in its natural state, and have been much amused with the remarks of my friends on the striking superiority of the English over the Scotch one.

MANGE IN HOGS.

From the Southern Planter.

McDonough, Ga. 19th May, 1834.

Mr. Editor—During my travels through the state, especially in towns and villages, I see a vast number of swine dying with what is called the mange, while many others are upon the eve of expiring. This disease is very easily cured if persons would only take the trouble of pulverizing sulphur, and give to each hog affected one table spoonful in a little corn meal dough twice a week for two weeks; they will shed the scurf and become perfectly clean and fatten. The sulphur at the same time destroys lice and fleas on the swine. S. M.

TEASELS.

From the New Hampshire Gazette.

There has been a great rise in the price of the teasel or fuller's thistle, and some farmers in Hatfield and Williamsburgh have lately received large sums of money for the produce of small quantities of land. Three or four years since, teasels were sold at 75 cents per thousand, and some as low as 67 cents; now the manufacturers give from $2 37 to 2 50 per thousand. Two farmers in Williamsburgh have recently sold teasels to the amount of 1500 dollars. In Hatfield, a single acre has in some instances yielded 100,000 teasels, which have brought over 237 dollars. There are very few acres, however, that do this. Two years are necessary to bring a teasel crop to maturity; the plants require much care and labor, and are liable to be winter-killed and to other injuries. After the price fell to 67 or 75 cents, the cultivation was relinquished by many, and the present high prices are owing to a great diminution in the quantity raised.

RAINY DAY REFLECTIONS OF A PRINCE EDWARD FARMER.

To the Editor of the Farmers' Register.

After the drought which has been severely felt in our county for some time past, the morning has set in with a gentle and refreshing rain—refreshing to the tobacco crop; but the largest portion of the corn has passed the period when the beneficial effects of rain would have been felt. As I will probably be within doors most of the day, I know not how to spend my time more pleasantly than by making some remarks on farming: not that I have the vanity to think that any thing which may drop from my feeble and inexperienced pen will greatly promote the agriculture of our country, but that if possible I may be able to prevent the formation of gullies, and promote the filling up of those already formed.

The present degenerate state of agriculture in Middle Virginia, seems to be owing principally to two causes, viz: grazing and injudicious ploughing. What is known as the "three shift system," is the one almost universal in this country. While some have adopted a better system, yet as a general observation it is true, that our farmers have no standing pastures for their cattle. While in other parts of the State which have adopted a system of improvement on their lands, the luxuriant and fertilizing clover is seen to carpet every field at rest, ours are trampled and grazed to barrenness by little half starved cattle and sheep, which can hardly by unceasing industry through a long summer's day, get enough hen-nest grass and broom-straw to keep them alive. After harvest all the sheep, hogs, cows, and horses, are driven to the stubble-field, to devour the scanty provision made by nature to improve the soil. I have no doubt that land would improve if suffered to rest every third year, (land which has not been entirely killed by injudicious management) simply by an effort of nature to that effect; but this kind of management would produce barrenness in the most fertile lands I have ever seen, much more on soils naturally thin, sandy, and subject to wash. I have doubts whether or not this part of Virginia can ever be profitably employed as a grazing country, under the best system that can be applied. Be this as it may, we have convincing evidence arising from the diminution of our products, and the numerous galls and gullies on almost every farm, that it will not do at the present day. Arguments have been used in favor of large stocks

of cattle; but all reasoning, however plausible it may seem at first view, must be rejected as fallacious and unsound, which leads to results diametrically opposite to those desired by every judicious farmer. The manure of a drove of cattle is a small consideration when placed as an offset against the evils of grazing; for after all he has only a part of the herbage transferred from one part of the farm to the other. The same reasoning will apply to winter as well as summer. The requisite quantity of provender for keeping a stock of cattle as they should be, would amount to more manure, if spread on the land, than if eaten and trod during the winter. If this reasoning be just, and if we will keep more cattle than our interest dictates, for one I must look on the *distemper* which has taken off such numbers of cattle in the south, not as it is generally viewed, but as a remedy for one of the sorest evils which has befallen our agriculture. When the distemper comes and takes half of our cows, (and it generally takes a larger proportion) more ample provision can be made for those that are left, and less injury will be inflicted by grazing, while at the same time the profits in butter, milk, &c. will be more ample from the few, than from the many.

With these unconnected reflections, I leave this part of the subject, and pass on to one of equal importance—that of ploughing. I lay it down as a maxim, the truth of which will not be questioned by any one who makes just pretentions to skill in any business, that whatever is worth doing at all, is worth doing well. If this be the case in other matters, it must apply with increased weight when brought to bear on the subject of farming—an occupation which gives prosperity and support to all others—the main-spring of all trades and professions. Judging from the manner in which most of our operations on the farm are performed, we conclude that this rule is not respected as it should be, even by those who acknowledge its correctness. Of this class (and a numerous one I am pained to say it is) are those who plough up and down hill. Reason with people on the impropriety of such a practice, and they will tell you they hav'nt time to turn at short rows—that theirs is the "good old way"—as if their lands would not wash, and as if a gulley formed in the day, it would close up in the succeeding night. After all that has been written on the advantages of horizontal ploughing, all that has been seen of its good effects in improving the lands, and after years of experience of evils on the opposite side they will still persist. This is what I call *Thomsonianism* (in other words quackery) in farming; and the effects of the one on the soil will work its own cure eventually, though as certainly as the other has *burned* and *steamed* itself to death in many infatuated communities of our country. Thousands of acres of land are now to be seen, once valuable and highly productive, now not worth the taxes. I think we should profit by the experience of such farmers, and that the day has come when we should have a better reason for doings things as some of us do than the one which actuated the young Dutchman when he preferred the old road up to the axletree at every step with stiff mud—"my fader did drive dis way, and I drive dis way too."

In old Prince Edward many are disposed to think this the garden spot of creation in a moral and intellectual point of view. As to the truth of this remark I shall not undertake to speak; this must be done by some one better qualified to do it with impartiality than the writer;—but will those who value those things as they should, together with a healthy climate and good market, go on with a system which has inflicted so heavy a curse on this part of Virginia, and if not forsaken will eventually render the rest a "howling wilderness?" If we should stop even at this late day and adopt a system of unyielding improvement, our country which in many places has grown gray in youth, might again, by plaster and clover, be made to smile in all the beauty and freshness of the "Old Dominion." Then we should feel strong inducements to stay in Virginia, much stronger than some feel to seek a home in the uncultivated wilds of the West. Should not every consideration induce us to do it? Our own private interests, those of our children and of our country, conspire in a loud and united call for thorough and instantaneous reform.

A. A. L.

Aug. 20. 1834.

COTTON—ITS INTRODUCTION, AND PROGRESS OF ITS CULTURE, IN THE UNITED STATES.

From the Southern Planter.

Gossypium or Cotton, a genus of the polyandria order, belonging to the monodelphia class of plants, and in the natural method ranking under the 37th order, Columnifera. The calyx is double, the exterior one tripid, the capsule quadrilocular, the seeds wrapt in cotton wool. There are four species, all of them natives of warm climates—1st. Herbaceum or common herbaceous cotton, has an herbaceous smooth stalk, two feet high, branching upward, five lobed, smooth leaves, and yellow flowers from the end of the branches, succeeded by roundish capsules full of seeds and cotton.—2d. The Hirsutum or hairy American cotton, hath hairy stalks branching laterally two or three feet high, palmated three and five lobed hairy leaves, and yellow flowers succeeded by large oval pods furnished with seeds and cotton. 3d. The Barbadense or Barbadoes shrubby cotton, hath a shrubby stalk branching four and five feet high, three lobed smooth leaves gladulous underneath, and yellow flowers succeeded by oval pods containing seeds and cotton. 4th. The Arboreum or tree cotton, hath an upright woody perennial stalk branching six or eight feet high, palmated four or five lobed, smooth leaves, and yellow flowers succeeded by large pods filled with seeds and cotton.—Encyclopedia Britannia, vol. 8, p. 21.

The above extract will more satisfactorily give the classification or order in which the cotton plant stands in the vegetable world than I could do, and I have the more readily adopted it, because it distinctly embraces all the cottons that are extensively cultivated in the United States, and little need be added except that the seeds of the first and second varieties, besides the cotton wool that covers them, have the seeds in whole in the second variety, and in part in the first, covered with a close short fur very analagous to the under fur of an animal; and in the United States all the cottons seem to have an increasing propensity to the production of the fur or down. It increases the diffi-

culty of separating the wool from the seed, but has no other injurious effect. Whether this change is in obedience to some slow, moving, but irresistible law of nature, applying as well to the vegetable as to the animal world, or arises from the intermingling of the farina of cottons of different varieties having in some districts been carelessly brought together, must be left to time and careful observation to determine.

The Sea Island Cotton of Georgia, and of course of Carolina, is derived from the fourth and last variety of cotton in the above classification. It would be perennial if the climate would permit it, and is so when the lands are new, and the soils warm and favorable. I have known it in new and warm alluvial soils to survive for five years; and have often seen it vindicate its claim to its character of arboreum or tree cotton, in the height to which it grew, for I have measured plants that were eighteen feet high, and that put on the character rather of trees than shrubs. But when the cotton grows so large it yields no return to the cultivator. The winter finds it still covered with blossoms or unripe fruit, and a single night of freezing weather, which may be expected by the first of November, blights at once, as well the fruit as the flowers and stems.

When this fourth variety of cotton was first introduced, this was the case, and I do not remember, (for I remember the time well,) that a single pod rewarded the attempts in giving promise to the future. But the winter of 1785 and 1786 were fortunately mild, the cotton under experiment had generally been planted in new, and warm, and fruitful soils—frost rarely penetrates far into the earth in such situations in Georgia. The roots of the cotton had been sheltered and protected by the *earth* from the cold, and that life which had slumbered in the roots of the plants during winter, was awakened into activity in the spring. The cotton stalks which had been killed in the winter were cut down to the surface of the ground. The shoots that grew up from the roots of the previous year were earlier in their growth, did not rise so high, sooner blossomed, and sooner bore fruit. The second year the cotton bore and ripened its fruit, the seed was in some degree acclimated, and the first steps taken which were to end in a few years in making the United States emphatically the cotton country. This great revolution in the commerce and manufactures of nations was effected by a few thousand people, scattered through the two Southern States of the American Union, not cheered on upon their labors by the bounties of one nation or the diminished duties of another; but rather living and laboring under the law of two great empires, who alternately sent increased duties and commercial restrictions, long embargoes, and war, and national tariffs, to oppress, and restrain, and control their labors—those labors which were to give to ten thousand ships their freight—to millions of men, women and children labor and the bread which it brought, and to millions more a cheaper covering than they ever wore.

But we will proceed to the objects of your inquiry and leave bad and blundering statesmen to the wrath of him, who visits the sins of the fathers upon the children to the third and fourth generation.

The provinces from Virginia to Georgia had been planted by the mother country for her own purposes. The persons who had emigrated to these plantations had gone to them with the hope of repairing or improving their condition; neither laws or religion had driven them there. Their interests still united them, and these feelings bound them to their own, or to their fathers' ancient home. When therefore the war of the American Revolution overtook them, the abstractions which were to break to pieces a great nation, and which for the first time perhaps in modern ages, had originated with the rulers and not with the ruled. These abstractions divided the southern colonists as they had divided the people of England; and although none felt that it was right that the descendants of Anglo-Saxon men should be taxed without being represented in the Parliament that taxed them, yet many thought the distant evils that would result from this course was to be borne rather than the immediate evil of civil war and its many consequences. Friends were therefore alienated from each other, and families broken asunder in their tenderest relations—but when peace came and individuals found themselves scattered that were once near each other—earlier remembrances were recalled—messages and letters began to be interchanged, and the position in which the revolutionary war had severally left them became known to each other. England rather remembering the past than looking to the future, seemed to be desirous of placing faithful sentinels at the two extremes of the American Republic. She therefore from her many colonies, selected Nova Scotia and the Bahama islands as the only colonies where a provision in land was to be made for the loyal men who had clung to her fortune through blood and in ruin. These provinces offered no inducements to the agriculturist at the time, but Providence more kind than government, was about to produce a great change in human affairs. Arkright had designed and perfected his spinning machine, between 1783 and 1785, and when the southern colonists were landed with their faithful slaves upon the rocks of the Bahama islands, in looking around for something upon which they might employ themselves, the new interest which cotton had awakened, in consequence of Arkright's machinery, reached them. Probably the Board of Trade invited, and may have aided them upon this subject, but at least they obtained the best cotton seed that was any where to be found, to commence their labors with. There is a small island in the Caribbean sea called Anguilla, which had been long known to produce the best cotton of the West Indies. The new settlers in the Bahama islands procured cotton seed to commence the culture with from Anguilla. They had in the year 1785 introduced the culture of cotton upon several of the Bahama islands successfully, particularly upon Long Island and Exuma. The father of the writer of this paper, in the winter of 1785 received from Col. Kellsall, then a planter upon Exuma, a bag of cotton seed. Several other persons in Georgia received about the same time cotton seed from their old associates or friends. Wishing to be particular, the writer will state what he remembers: among the persons who did receive cotton seed was Josiah Tattnall of Savannah, from his father then Surveyor General of the Bahama islands. From the cotton seed transmitted that winter in small parcels from the Bahama islands, has grown up the sea island cotton of Georgia and

South Carolina. In the long and diligent cultivation of cotton for now almost forty years, many changes have been observed to have come over the cotton under the influence of soil and climate; but the writer can distinctly state that the cotton he now grows is descended in direct line from the cotton seed received by his father from Col. Kellsall, and that every plant of sea island cotton in either Georgia or Carolina, is derived from the small parcels of cotton seed transmitted about that time from the Bahama islands, and which was the seed known in the West Indies as the Anguilla cotton.

It was soon noticed by cotton growers that soil and situation had more than common influence, as well upon the quality as upon the quantity of cotton produced upon any given portion of land. Certain soils and situations retained in the cotton its original appearance, an intenseness of yellow in its blossom, a fruit full and sound, a seed quite black, and free from fur or down; while upon other soils and upon other situations the plant, the flower and fruit was putting on other appearances. The plants as if anxious to adjust themselves to a new temperature, took on a more coarse configuration of limbs and stem, a thicker branch, a rougher, larger and more scalloped leaf, a more cone like pod, a seed covered either in whole or at its points with the close down or fur that has already been described. At first the most careful cultivators were anxious by selection to keep the seed as much as possible resembling the seed first introduced; that is, black and free from down, and the more so as it was most easily separated from the cotton by the machines employed, and was considered most productive; but in process of time the varieties that stole up among the original stock was found to produce a finer and more uniform and longer wool. The current of selection has now therefore directed itself another way, and these hybrids, for I believe them to be so, although the germs of these changes may have lingered for ages in the original seed without developing themselves, have taken on three distinct appearances in seed; neither in blossom or plant differing to the eye from each other, although greatly differing from the parent stock, as being coarser and rougher in their form and leaf, with blossoms of a lighter yellow; having bolls larger and more cone like in their shape. The finer cottons of the sea islands are obtained from these three varieties of seed: one with little or no down upon it, but with a long beak or point, to a seed longer than the original; a seed with down upon the two ends, but still with the pointed beak; and thirdly, a long seed with a sharp beak but completely covered with a soft close fine fur or down inseparably connected with the shell of the seed. These new varieties which produce the cotton now most in request are later in perfecting their fruit, and have consequently increased the uncertainty of the most uncertain and doubtful crop to which perhaps human care was ever directed.

But we will now proceed to describe the situation and soils. There is a long string of islands extending from Georgetown in South Carolina to St. Marys in Georgia, that is, from 32° 30′ to 30° north, a distance of about 200 miles. These islands were covered with live oak and other evergreens of a southern climate. They had been the abode of the red men of the West, but rather when the natives were fishermen than hunters; and the vast accumulation of oyster, and clam, and other shells, mingled with the remains of the bones and pottery of their old inhabitants, fill every stranger with astonishment at the multitudes which their remains would bespeak, or the long time that must have been required to introduce such accumulated masses. These decaying shells seem to have intermingled with the original sandy soils of these islands, and digesting the vegetable matter that fell from trees and other sources, formed with them a light and fertile loam. These islands at an earlier period of colonial story, had been employed in growing indigo. It was upon two of these islands, surrounded by the salt waters of the sea, and separated from the continent by several miles of grassy but salt meadows, that the cultivation of the sea island cotton commenced.

If Frederick the Great, never forgot him that introduced a better description of rye into Prussia, and if Swift is right in saying he merits a great name who will make two blades of grass grow where one had grown before, why should we deny to the dead what may be their due? The first cultivators of the sea island cotton in Georgia, were Josiah Tattnall, and Nicholas Turnbull, on Skideway island near Savannah; James Spalding and Alexander Bisset, upon St. Simon's island at the mouth of the Altamaha; and Richard Leake upon Jekyl island adjacent to St. Simons.—For many years after the introduction of the Anguilla cotton, it was confined to the warm highland of these islands, bathed by the saline atmosphere, and surrounded by the salt water of the sea. Gradually, however, the cotton culture was extended into lower grounds, and beyond the limits of the islands to the adjacent shores of the continent —into soils containing a mixture of clay, and lastly into coarse clays, deposited by the great rivers where they met the tides of the sea. In all these soils the cotton plant grows well. In all these soils fine cottons are produced. The only essential property that is required, is a saline atmosphere: with it any soil in Georgia or Carolina may produce fine cotton—without it no soil will produce fine cotton.

It is within this district of country, from Georgetown in South Carolina to St. Marys in Georgia, and extending not more than fifteen miles from the sea, to which the sea island cotton is still confined. Whenever it has been carried either south, or north, or west beyond these limits, a certain decline in quality has followed its removal. Many changes have taken place in the manner of cultivating the sea island cotton since the first introduction. When first introduced, the seed was deposited either in hills raised a little above the common surface at five feet distant each way, or in holes at the same distance apart, and the intermediate spaces were dug up, pulverized and kept free of grass or weeds by the hand hoe or by ploughing. But it was soon found that this distant planting, with a few seeds only, left a great portion of the field unoccupied by plants, and consequently unproductive; for as it has already been said, the cotton plant is one of the tenderest productions of vegetable life. The growers of cotton found it therefore necessary to increase the quantity of seed, to insure a sufficient number of plants, and to bring them nearer together. Fortunately for the cotton culture, Tull's book upon husbandry had been

more read in the southern colonies than in England; and his ridge husbandry was adopted for sea island cotton, and is particularly adapted to it, I may say necessary to its successful culture.

The present process, (and it has been the same for twenty-five years past,) is to make up the field into ridges occupying five feet of space each, and extending in straight lines across the entire field. If the land is at all low or subject in any degree to water, these ridges are intersected at one hundred and five feet from each other by ditches which receive the water that may collect in the hollow spaces upon which the cotton plant is growing. These hollow spaces represent the water furrow in wheat cultivation, and serve the same purpose, that is, in directing the redundant water that falls, into the drains that take it off the fields.

A field is well prepared to receive the cotton seed when drains intersect it at regular distances of one hundred and five feet; when the surface of the land is thrown up into ridges of five feet, rising about ten inches above the intervals, the crown of the ridge flat, broad and regular. A trench is then made along the middle of the ridge from two to four inches, dependent upon the time of planting, which extends from the first of March to the first of May. Upon this subject as upon all others in which men are concerned, wisdom is found between the extremes; and experienced growers of cotton generally prefer planting from the first to the fifteenth of April. When cotton is planted early in March, before the sun has warmed the soil to any great depth, it is necessary to deposite the seed in drills not more than two inches deep, or there will not be warmth enough to vegetate the seed. Later in the season when the power of the sun has increased, it is necessary, in seeking for that moisture which is as requisite for vegetation as heat itself, to sink deeper into the soil, and the drills which are then made to receive the cotton seed are required to be four inches deep. From the many accidents to which this feeble plant is subject in its first growth, experience has taught the Georgia cultivator that it is necessary to place many more seeds in the ground than can grow there; and it is usual therefore to sow at least one bushel of cotton seed to the English acre. The persons employed in planting the cotton are generally divided into gangs of three. One of these opens the drill along the top of the ridge; the most intelligent of them carefully drops the seed into the trench, while the third follows in his, or more often in *her* steps, and with a hand hoe returns the soil while yet moist into the trench from whence it was taken. For myself, I prefer performing this operation with the foot; it is less troublesome to the laborer than carrying and using the hoe. It keeps the mind intent upon one operation rather than two. Walking along erect, the feet are alternately employed to return the soil into the trench upon the cotton seed; and the whole weight of the person brought to bear upon the foot that has just performed the operation, presses the yielding and crumbling soil into close compact with the seed. This pressure of the foot after sowing, is like the roller in English husbandry, and is as beneficial to cotton as the roller is known to be to wheat or other grain. But after all this care, you are never sure that from your first sowing a sufficient number of plants will stand. One night's frost, which sometimes comes as late as April, will destroy the whole field, and drive you back upon your labors; one day of a strong, dry, north east wind will tear, blight, and destroy your whole field; and upon the best and richest soils, when both these evils are passed over, there is another ensuing, equally destructive. The cock chaffer or cut worm is to be apprehended during all the month of April, and as the cotton comes through the ground and remains for several days, like the pea or other pulse, with but two radical leaves, every one of the plants that are cut by the worm, either above or below the ground, are destroyed; so that it is not unfrequent that whole fields have to be replanted in the month of May; about which time the worms pass into their winged state. At the close of the month of May, when apprehension from these accidents have passed away, a new labor begins. The numerous plants which crowd the ground, begin to injure each other and must be removed. Prudent persons divide their removal into three operations, gradually adjusting the number to the increased growth of the plants, which are at length left in the drills, at from six inches to twenty-four inches apart from each other, depending upon the fertility of the soil and the expected growth of the plant, which rises in altitude, from three feet to eight feet high. And here it may be well to observe, that the cotton plant is a leguminous plant, (a green plant,) a plant that sends its roots down into the ground, and draws much of its nourishment, by its broad leaves, from the atmosphere. This increased distance in the drill, therefore, is rather to allow space for the plant to extend itself at its inclination, than from a desire to add nourishment to its roots, for at last the whole field should be shaded from the sun when the plants are fully grown, and the number should be adapted to that end.

But at every one of these *thinnings* as they are called, or drawing of the plants, the field is cleared with the hand hoe from all weeds and grass, and new soil brought up around the remaining plants to support them, now bending to every wind, from their tall but feeble structure. This course of thinning when it is necessary, and the weeding, and grassing, and drawing up, which is always necessary, continues until about the 20th July, by which time the operation has been repeated from three to six several times, dependent upon the soil and season. About the 20th July we may expect our summer rains should commence. These rains are not tropical, but they approach to tropical in their violence. Up to that time no climate can be more temperate than the climate of the sea coasts of Georgia and Carolina. Volney, from report, supposed it the best in the United States, and the writer of this paper believes it is so. The atmosphere is elastic, the winds that blow every day from the sea are cool and refreshing; they bring health and healing upon their wings; they drive the vapors which have been gathered upon the waters, or that have arisen from the marshes which margin the shores, over the woods of the interior. But the time has now come when evil spirits should prevail. These vapors have been collecting dark and ponderous clouds upon our western hills; the equilibrium of our atmosphere is destroyed. Whether it is that the adjacent seas have become heated by the mass of warm water which the gulf stream brings along the coast, or that the same general cause which operates with

such great power within the tropics, operates in part here, I know not. But from the 20th July to the 1st August, the winds change from southeast to southwest and bring down clouds charged with lightning and rain, in such masses as to deluge our fields. From the time this change takes place all labor in the cotton field should cease; for the plants, with broad, succulent leaves, and tall and slender stem, heavy naturally, in its growth, and feeble in its structure, can illy bear up against beating rains and strong winds, and requires all the support that the original ridge in which it was planted, and the repeated dressings up which have been directed, can give it. And hence arises the necessity of the ridge husbandry of the sea island cotton, in Georgia and Carolina, and the importance of the repeated gathering or dressing up of the soil to the plants which has been described. The month of August is a month of doubt and anxiety with the cotton grower. Too much rain makes the plant cast off its fruit, its blossoms, and even its leaves. The full moon in the month of August too, is the time when the caterpillar is expected. This worm proceeds from a small brown butterfly, greatly resembling the candle moth. This moth or butterfly deposites its eggs upon the leaf of the cotton plant always a night or two before the full or change of the moon. They hatch in a few hours after they are deposited, then so small as scarcely to be visible to the naked eye. Like the silk worm, they appear to linger in their first stages, doing no great injury during their first nine or ten days. But a few days before they have completed their growth, they become voracious in the extreme, and like the visitations of the locusts in the east, destroy whole fields in a few days. We have seen four hundred acres of cotton that looked promising and well to day, and that four days afterwards had not a green leaf, and scarcely a small pod remaining upon it. These destructive visitations, judging from the past, may be expected once in about seven years. When cotton fields have escaped injury from rains, from wind, or worms, they offer as beautiful a spectacle to the observer, as the cultivation of any plant can present. One wide and waving field of green leaves, covered from the first day of July to the first day of September with blossoms of three colors, and with a multitude of pods of every growth. The blossom on the first day of its coming out is of a fine yellow color, and it sustains that color during the day. It changes under the influence of the night air to a crimson or red hue; and again on the third day it becomes of a rich chocolate brown, and falling to the ground leaves a pod already of half an inch in diameter. The time which intervenes from the blossoming to the perfection of the fruit, greatly varies, depending upon the season. We have marked hundreds of blossoms which ripened and perfected their cotton in twenty-one days from the day of blossoming; and again we have frequently seen them require six weeks to arrive at the same end; which is however a bad omen, as to ultimate results.

The cotton pods begin to open about the first of August. From this time to the first of December the whole attention of the cultivator is directed to the picking in of the cotton as the pods daily open. During this autumnal season in Georgia and Carolina upon the sea coast, the winds are violent and the rains heavy; so that the operation is tedious although not laborious; and during this time the persons employed may be expected to gather from the field 25 pounds per day, when the weather admits of gathering or picking cotton as it is called. When every thing is favorable the persons employed should bring in 50 lbs. daily of cotton in the seed; but as the gathering is continued so long as they bring in 10 lbs. twenty-five may be considered the full average of labor so directed. There are few subjects upon which there is more contrariety of opinion than upon the real amount of product given by the soil in any cultivation; agriculturist as I am, loving my profession as I do, seeking information to enlighten my labors as I have done, I know no book upon which I can lay my hand which would give me correctly the real mean result of labor or of land employed upon any one object throughout a whole extended district. The Abbe Raynal kindly tells us how many coffee plants and how many cotton plants grew upon the French part of the Island of St. Domingo; and yet there was not one planter in St. Domingo who could really have told how many cotton plants or how many coffee plants grew upon any one arpent of his own field. Taking however the best means my long experience would give, I should say that a laborer cultivates, in sea island cotton, four English acres, and that these four acres yield as the result of his labor 500 weight of clean cotton, or cotton separated from the seed, which consists of 400 weight of white cotton and 100 weight of colored or stained cotton; and that these 500 pounds of clean cotton have for the last fifteen years averaged to the grower 20 cents per pound for his white cotton, and 10 cents per pound for his stained cotton, yielding in American money, consequently $90 to the laborer—a small remuneration, certainly, to the cultivator, and not calculated to excite jealousy or hostility in any other persons engaged in any other pursuit.

The "*process of preparing sea island cotton for market.*"—The process in preparing the cotton for market commences as soon as it is generally gathered in from the field and is tedious and troublesome in a high degree—the cotton when gathered from the plant, is put into a bag, containing about a half bushel, which hangs upon the person engaged in the operation, suspended from the neck or waist as they may prefer, and when it is desired by them they deposite the contents of the bag in a large light basket, which contains the amount of each one's gathering in the day. At the approach of night, the cotton gathered in the day is brought home and weighed and deposited in a common house, from whence the next morning if the weather is good, it is carried out and spread upon drying floors, made of two inch American pine. These floors are of course proportioned to the quantity of cotton expected to be placed upon them at any one time, but may be estimated at twenty by forty feet of floor to every hundred acres of cotton cultivated; and in that ratio of quantities upon these floors. If it has been gathered from the fields in good weather, the cotton is allowed to remain but one day to take off the dew of the morning or the damp of the night air; but if gathered in wet weather, it may require two or even three days exposure upon the drying floors, which are raised upon posts three feet from the ground, as well to preserve the wood of which they are made, as to admit a more free circulation of air. It is how-

ever known that strong cold winds or very bright suns, if continued too long, have an injurious effect upon the fibre of the cotton; and this extreme exposure to either wind or rain is, therefore, carefully avoided, and the cotton left no longer upon the drying floors than is necessary to preserve it from heating in the house. Before it is put up finally in the house, it is usual and quite proper to pass it through what is called a "Whipper" to shake off any sand or broken leaves, or any other extraneous matter that may have attached itself to the cotton, either in the field or in the gathering. The cotton having been gathered, dried upon the floors, and whipped, is ready for the next operation, or ginning.

The whipper, which is a very necessary instrument in the well preparing of cotton, is made of wood, is a long barrel, composed of slats, or reeds, (or it might be better made of wire,) six or eight feet in length, and two feet in diameter, with one end closed and the other open, and is supported at the two ends by feet of different lengths, so that the barrel in its horizontal position declines about one foot at the lower end; a hopper containing about a bushel rests upon the upper side of the barrel, at the upper enclosed end of it. This hopper lets the cotton that is to be cleaned, fall into the barrel, through which runs in its whole length a shaft which is turned by the hand, by a crank attached to the shaft at the end. This shaft is intersected by rods, which reach to within an inch of the barrel. The cotton, as it falls from the hopper, is whirled round and round by these rods, until it escapes at the lower end of the barrel, by which time any sand or dirt, or leaves, or other matter, attached to the cotton has escaped through the spaces intentionally left between the slats or reeds, which constitute the external rim of this barrel or whipper. This whipping was formerly performed as well upon the cotton in the seed as after it was separated from the seed; but the second operation of the whipper has latterly been discontinued under a belief that it produced a stringy appearance in the cotton wool.

The whipping of cotton at its first gathering and while attached to the seed, is really beneficial and should never be omitted. When these operations are completed, the harvest may be considered as closed, and the preparation of the cotton for market really begins.—Many machines have been designed, and many forms of the same machine adopted, for separating the seed from the sea island cotton, but all of them at last resolve themselves into two wooden rollers turning by opposite movements upon each other. The rollers are from half an inch to an inch in diameter, and revolve from one hundred times to five hundred times in a minute. The whole resolving itself into this simple rule, that the smaller the rollers and the slower they revolve, the cleaner will be the cotton separated from the seed, because if the rollers are an inch in diameter, and above all if they revolve with a high velocity, they will take in soft seeds, small seeds, and false seeds or motes as they are called, and in crushing them in their passage through the rollers, will stain and injure the cotton in its appearance.

Much money has been spent upon costly machines, propelled by horses, by water or by wind, first in the Bahama Islands, and for many years in Georgia and Carolina, but at last most of the growers of sea island cotton, have returned to their first and most simple machine, to wit, two wooden rollers kept together by a wooden frame, and a square shaft, upon which is fixed a wooden or iron fly wheel, from two to three feet in diameter. The iron cranks which turn the rollers are connected by strips of wood with a treadle worked by the foot, this treadle runs under the machine, and is connected at the farther end of the floor of the house, by sockets within which it revolves; the man stands therefore in the front of the rollers, with a board between him and the rollers, upon which he holds a large handful of seed cotton, which he presents from time to time to the rollers, that are kept in motion by the pressure of the foot upon the treadle,—this labor from habit becomes easy, as the feet is often changed in the operation. The task expected from the laborer with the machine, (which costs when new and complete ten American dollars,) is from twenty-five to thirty pounds per day. Women from their careful attention, in keeping the rollers while they revolve upon each other, well supplied with seed cotton, were unquestionably the best ginners, as they are called from the term gin applied to the machine, but in process of time it began to be believed, that the continued motion of the feet produced a relaxed system in women, which was likely to lead in the end to abortion, or miscarriage, men have consequently been substituted for this work, one which being within doors, and exercising both hands and feet without very much labor is preferred by them to any other in the winter. What is a little surprising, this simple machine, the foot gin, which we received from the West Indies, is mentioned if I mistake not, in the remains of "Nearchus's," voyage down the Hindus in Alexander's expedition, as gleaned and translated by Dr. Vincent, or Maj. Rennell in his map of Hindoston, as there employed for separating the seed from the wool which, the Greeks, for the first time, saw growing upon trees and shrubs. Could Asia Minor, could Greece and Egypt, have been acquainted with the cotton plant up to that time? The inquiry is a little curious, nor is it uninteresting, but can better far be made, by one who lives surrounded by much of the wreck of past knowledge, by many of the memorials of past time, than by him who is living, in solitude, under the shadow of his oaks, on the shores of the Altamaha. But we will return from our wanderings, to the subject of your inquiries. To prepare the cotton for this ginning, or separation from the seed; when taken from the house where it was put, from the field, it is carefully looked over and separated, or sorted, as it is called, the yellow cotton, the motes, any hard rotten, that may have passed through the whipper, is separated from the white; this is a work of care and attention and the future appearance of the cotton, much depends upon the manner in which this work is done. Women are employed in this operation, seated upon benches with tables before them; the seed cotton is spread in small parcels, taken out of one basket examined and turned over to another into which the person puts the entire of her day's labor. The quantity required to be thus examined and cleaned in the day by each one, is from sixty to one hundred pounds, according to the care bestowed upon the cotton, by the grower; after this sorting, it is exposed lightly and shortly to the sun, that it may take off any damp-

ness the cotton may have acquired in the house; it is then passed from this drying immediately to the gin, or machine that separates the seed from the wool; after going through the gin and being separated from the seed, it is again turned over to the women who are generally in a large room, well lighted with glass windows. They sit with small tables before them, made, either with open slats, reeds, or wire, when any crushed seeds, any burnt, or blackened by the machine, and mote that has escaped the former searches are removed; and to have this work well done, thirty pounds is all that is required per day from each woman. After this third operation it is considered ready to be bagged for market.

The bags in which sea island cotton is shipped are almost exclusively Scotch, are made of hemp, forty-two inches wide, in the web, and should weigh one and a half pounds to the yard; these bags each required from four and one-quarter to four and one-half yards, and then are made to receive three hundred pounds of cotton. Two men are generally employed at a time in packing, and usually pack two bags in a day, in the manner following. The room into which the cotton has finally passed, after being prepared for the bag, is reserved expressly for that purpose, and is kept as clean in floor and walls as possible; adjoining to it is a small apartment under the same cover with a round hole made in the floor, just large enough to contain the bag when full of cotton, the open end of the empty bag is strongly sewed with twine, round a strong hoop, which extending beyond the hole suspends the bag vertically from it; one of the men then gets into the bag, with a heavy wooden or iron pestle, he presses the cotton gradually with his feet, and finally beats it down with the pestle, until the requisite quantity is pressed down into the bag. The bags were formerly made wet before they began to fill them, under the belief that it kept the cotton down in the bag, when pressed there, better than when dry, but this is an idle and often an injurious practice and should be always avoided. We will now look back and collect the quantities of labor that is or should be applied to every bale of 300 lbs. of sea island cotton in preparing it for market. It requires 1000 lbs. of seed cotton to produce 300 lbs. of clean white cotton wool; 15 persons will be required to sort and prepare this 1000 lbs. for the gin or machine, taking all weather 25 lbs. is the mean quantity, received from each gin per day, this gives 12 days labor to each bag for ginning; and 10 women mote these 300 lbs. of cotton in the day, making for sorting 15, for ginning 12, for moting 10, for packing 1, in all 38. But besides these 38 that must be good and steady persons, there are usually two inferior persons, young or old to place the cotton which is about to be ginned upon the drying floor, or to remove and pass it about in any change of weather, thus requiring to every bag of sea island cotton well put up, the labor of 40 persons one day. The bag costs for bagging, for twine and trouble in making not less than 1 dollar and twenty-five cents, of American money—this, with 75 cents for freight is to be subtracted from the value of the cotton as there is never any return made for the bag by the purchaser.

The quantity of sea island cotton has not materially increased within these last ten years, nor is it likely that it will increase. The particular soils and climate that have heretofore produced it and so while it probably owes its quality and confined to the limits first stated, that is from Georgetown in South Carolina to St. Marys in Georgia. By looking at a map of the United States it will be seen that the long string of islands that bound our southern shore and separate the Atlantic Ocean from the continent and at these points; but what is more, the tides that probably assisted to cast up these island, have changed their climate. The tides along the shores of North Carolina and Virginia, are much less than in Georgia, and they rise still less in Florida, and the Gulf of Mexico, that bounds the new acquired provinces of the American Union, to the south west.

Whether it is, that the cultivation of the sea island cotton, has afforded, fewer inducements than other subjects of cultivation; certain it is, the number of those engaged in it, even within these limited districts, have not greatly increased, and it is the successors, of the first cultivators, that are still engaged upon this object. They are generally an educated people, and a stationary one, less anxious after change than their countrymen are supposed to be, and although, severely smitten in war by England, and in peace by the National Tariff, they have still clung with some degree of fondness, to the places, whereat they were born, and to the seas, in which they were bred.

Short Staple Cotton.—The short staple cottons, of every part of the United States, are derived from the first and second varieties of cotton, were found in the United States, from Virginia to Georgia, at the close of the American Revolutionary War, cultivated in small quantities by the poorer classes of the white population of the country, to be mixed, in their domestic manufactories, with their own wool. The cotton for this purpose, was separated from the seed, by the old and the young, with the fingers, sitting around their evening fire, and was spun by the hand wheel, to serve as a warp, to be filled, with the wool of their own sheep.

These two descriptions of cotton, that is the common herbaceous cotton with smooth leaves No. 1 in the classification, and the 2d or hairy American cotton, were cultivated by very many for domestic purposes, but I have no where seen or heard of any attempt at producing either of these cottons for sale, before the introduction of the West India seed, and the increased attention this circumstance produced to the subject. Whether indigo and tobacco, the great staples of the southern provinces, were preferred to it, or whether, (which is probable,) the difficulty which was found in separating the seed from the wool by any other means than the hands, had checked cultivation, I know not, but probably both combined.—Three or four years since, the writer of this paper, having written a letter upon American cottons at the desire of a gentleman in England, ventured to suppose that these two varieties of cotton had been introduced into Virginia by some one or other of the early governors of that province while under the patronage of the crown. Subsequently to that time, in some of the long discussions within and without the halls of the American Congress, upon the American system of duties, it has been discovered that cotton had been introduced many years since into Virginia, from the Turkish dominions in Asia, probably from Smyrna; and the

cotton seed stole along with the Virginian colonization of the Southern States; for in truth, the Southern States of the American Confederacy are colonies of Virginia more or less directly derived, while the northwestern States of the American Confederacy are colonists more or less direct, from the New England States, with all of their industry and much of that economy which qualifies them the better for being farmers where little is risked and patient industry is sure of moderate reward, than in being planters or growers upon a large scale of products, which sometimes well reward enterprise, but too often disappoint the sanguine expectant, and send him homeless and houseless, in his age, to seek still farther south or farther west for cheaper and for fresher soils to labor upon. But whereever he roams, however unfortunate his condition, the cotton seed, like the maze seeds, is carried along with him. The one supplies him with bread, and the other supplies the material for his clothing, or affords him the means of buying it. It is this roving disposition of the southern American people, who carry their cotton seed to seek for newer and for fresher fields, as the Tartar of the steppes drives his flocks to browse on newer and on greener pastures—it is this almost mysterious love of change of situation that has in so few years, produced that wonderful revolution in the cotton trade of the world. Without this roving propensity, centuries could not have produced the effect that twenty years have accomplished. Other countries are as well adapted to cotton as the United States. There are the States along the Mediterranean Sea, there are many of the countries of Asia, there are the many islands of the Eastern Sea, but above all, there is wide-spread Brazil: these were all laboring upon cotton before the American people thought of it. But what then? The spirit that moved along the wilderness was wanting; the Pacha of Egypt may plan, other jealous governments may offer bounties and rewards, but that is wanting; that is wanting to the seekers after perpetual motion, life, and self-motion, in the mass that is to be acted upon. God has yet reserved to himself this vitality, and has neither yielded it up to the ruler or the ruled.

But to return from this disgression, which it is hoped is not unnecessary, as the cause must ever precede the effect, and it was considered well to give the cause before we passed to the effects. As soon as the attention of the Southern States was called to the profitable cultivation of cotton, by a few persons along the shores of Georgia and Carolina, the cultivation began to be extended into the interior. The small quantity of cotton that had been grown for domestic uses, was exchanged for larger quantities to be prepared for sale. But the great difficulty to be overcome in the progress to extension, was to find out any instrument by which the cotton wool could be separated from the seed.

By this time various machines had been introduced for ginning the sea island cotton, but all of them ended at last in two rollers revolving upon each other, either longer or shorter, and moving with, some more, some less, velocity. These rollers were but badly adapted to the hairy cotton or second variety, which soon began to obtain the preference in the interior of Georgia and South Carolina, over the first or smooth leaved variety, and merited to obtain that preference, as giving when separated from its downy seed, a finer and stronger although shorter fibre, and as perfecting its fruit sooner, but which it was almost impossible to separate with the rollers, because the down or fur upon the seed retained the seed hanging upon the roller, and denied admission to the rollers of the fresh cotton in the seed that was offered. Many plans were suggested, many substitutes for the rollers designed. All succeeded in part, but still they went on slow. Something was desired to do much in a short time: something that was strong enough to travel about without being broken to pieces, and light enough to move with its moving master. At last such a thing was found, in Miller and Whitney's gin, probably not the best machine that could have been designed, but so operative to its end, so efficient to its purpose, that it took possession of the whole ground; from thenceforward no other machine was sought for, and Miller and Whitney's gin is employed to separate the cotton seed from Virginia to Louisiana, save where the roller gin is used, and its use is now altogether confined to the sea island cotton, whose superior value is supposed to warrant the great increase of labor necessary in that mode of ginning. Miller and Whitney's gin was designed by Mr. Whitney and executed at the plantation of Mr. Miller, sixteen miles above Savannah, about the year 1795, and it seems to be derived from two machines already used upon cotton, a kind of cylindrical whipper, and the circular cards, before that time introduced in manufacturing cotton; a wooden shaft or roller enclosed within a wooden box. This roller or shaft has at every inch of its length a steel blade or saw, about a foot in diameter; above these saws is a box containing the cotton in the seed. The box has the bottom of mettle slits, through which the saws pass about an inch, and pulling of the cotton, but sometimes cutting the fibre as it passes. This revolving of the saws carries the cotton in the box gradually round until the seeds contained in the box are freed of the wool attached to them, when it is emptied of the seed and refilled with fresh cotton; it too often leaves some of the fibre behind it, which diminishes the quantity as well as injures the quality, so much so that the estimated difference of the products in these two modes of ginning are, with rollers 300 lbs. to the one 1000, and 250 lbs. to the 1000 with Miller and Whitney's gin. This gin having at last given a cheap and expeditious mode of taking the wool from the hairy American cotton, (for a gin that cost ten pounds sterling will clean a bale a day with a single horse acting upon the gin, with a band wheel which any man can make for himself,) the cultivation of this description of cotton diverged in all directions around Georgia as the common centre: it went north into the two Carolinas; it went west into the hill country of all the Southern States; it was found capable of adjusting itself to the soil and climate of the interior country, which the Anguilla cotton had not been adapted to; still the fibre of the hairy or short staple cotton is better near the sea than in the interior. Above all, it is found to be most productive in alluvial soils that are a little touched with salt, as are some of the districts of Louisiana, where the rivers rising in the Rocky Mountains draw some of their waters through the salt and arid plants which separate the waters of the Arkansas from the waters of Red River, where these

two varieties of cotton, and a cotton that is possibly a hybrid between them, have arrived at the greatest perfection. It is there that soils which are deeply tinged with red, and heavily seasoned with salt, which all the tributary streams of Red River flowing in from the north, bring with them, give forth the most abundant crops, of the best quality of these descriptions of cotton. Directing myself by the information received from one or two friends who have property there, I should say, with reasonable diligence and attention to the object, 1000 lbs. of seed cotton, or about 250 lbs. of cotton wool may be expected to the English acre, while the average products of the hill lands from the Mississippi to North Carolina should not be taken at more than 500 lbs. of seed cotton, or half the quantity, nor do I believe there is any material difference upon the great scale of products through this wide extent of country, judging for myself from personal observation, for I have passed through all these districts, yet scarcely a year passes without the newspapers announcing some new discovered land of promise within these wide limits, themselves misled by some single or partial result, or stimulated on by land speculators, a curse of no common character to a new country. But in whatever cause originating, the evil is the same. These rumors fall among a people already heated with a desire of change—a people quite sensible to present evils, but not reflective enough to hold in remembrance that every wave of the hand without necessity, and every momentary evolvement of time without usefulness, is a waste of power and waste of time irreclaimable to humanity. The system of agriculture through all those districts, is essentially the same. You find the Virginian upon Red River; you find the North Carolina man, the South Carolina man, and the man from Georgia, along side of him; any improvements, any increased quantity of product, by any new course of cultivation, spreads like the fire of the American prairie, a spark has carried it, and enkindled it, far in advance of the mass of flame that rolls after it. Any substantial improvements therefore, that is made in Virginia, or Georgia, from this extension of mind, from this intermingling of men, is as likely to be reflected back upon the intermediate country from Red River, as to reach it, from its first source. The system of cultivation is therefore the same: the moment the cultivation of cotton spread into the interior country, from the shores of Georgia, and South Carolina, the hand-hoe was exchanged for the plough. The latter instrument had been employed at all times, and in all cultures in the hill country of the southern states; in no agricultural country were oxen or horses cheaper, in no agricultural country were soils freer for the plough-share, but it was not adapted to the sea coast, because the land is so little above the waters that ebb and flow, that many drains, inconvenient to the ploughman, are required to carry off the surface waters, the trees too, of necessity send their roots along the surface, rather than vertically in quest of moisture, and many of them like the live oak are scarcely destructible by time. They too obstruct his course; but above all, the plant under cultivation sends its roots around in quest rather of nourishment than down in quest of moisture, and must not be too rudely dealt with; these various causes, have finally, after long experience, fixed the hoe husbandry upon the sea coast, and carried the plough husbandry into the hills. The short staple cotton, is therefore as exclusively cultivated by the plough, as the sea island cotton is exclusively cultivated by the hoe. The manner of treating the plant is really the same, the hoe dressing the land more neatly and garden like, the plough breaking up the land more radically, and extending far more widely its operation, for the quantity of force employed. The consequence has been, that while four English acres is the quantity cultivated upon the sea coast of Georgia, and Carolina with the hand hoe, eight acres is about the quantity cultivated of short staple cotton in the interior with the plough. It is the ridge husbandry in both instances that is now pursued, more neatly executed in the first instance by the hoe, and more roughly by the plough in the second, but still the same. The month of April is the best time of planting either variety. The distance between the ridges is most generally five feet, the plants left in the drills, varying from 6 to 24 inches, dependent as before stated upon the expected growth of the plants. Two other circumstances contributed to aid the cultivation of short staple, extrinsic of soil or real products. The winds of autumn are far more violent upon the sea coast of Georgia and Carolina, than in the interior country, and the capsules that contain the sea island cotton expand more than those that contain the short staple, so that the first has to be gathered much more frequently, from the fields than the last, or it falls to the ground, and is lost. The consequence is, the general gathering to the laborer, per day, is more than twice the quantity of short staple, than of sea island, for it is allowed to hang upon the plants, until they are white with the open cotton, so that there is only two and at best three gatherings of the one, to ten, or twelve scanty gleanings of the other. This one circumstance, more than any other, gives to the grower of short staple cotton, the power of something more than duplicating the quantity of cotton wool produced, by the same quantity of labor expended. But it is time, that we should look back, and see if there has been any thing omitted, necessary to be known, in the cultivation of the cotton plant or in preparing the cotton wool in the United States. Cottons of various kinds, grow well, and perfect their fruit, from the southern borders of Virginia, to the south western streams of the Mississippi, a space of 1200 miles, and from the sea, for 200 miles into the interior, through this wide space of country, in every soil, whether of clay, or loam, or even sand, the cotton plant will grow, and produce its seed and wool its accompaniment, provided the waters are kept well drained from the surface of the land. The quantity of products will of course depend upon the soils, whatever they may be, containing these ingredients which constitute fertility in all countries, which neither experiment, or the philosophy of chemistry has yet been able fully to discover, or define. The mean quantity given of 100 lbs. of sea island cotton wool, to the English acre, and of 125 lbs. of short staple cotton to the same quantity of land, we believe, not materially wrong, but the quantity of labor to bring forth these results, are very different. The sea island cotton is cultivated neatly by the hoe, the short staple more roughly by the plough, still it is, or should be, the ridge husbandry in both instances. The plants

are left to stand in drills upon the ridge, at distances from each other, graduated as before stated, to the expected growth of the plants from six inches, to two feet from each other, and bearing without injury to stand much nearer than at first sight may be imagined, for the cotton plant, does not occupy much space, with its roots, sending them down into the ground, and not over the surface, like white or grain crops, and drawing like all large leaved green crops, much of its nourishment from the atmosphere. It is not an exhauster of soil, shading and protecting it from the sun, and soon by its decay, or by its combustion returning almost as much as it has taken away, but from the density of its shade, and the size and swell of its roots, it soon makes the soil too loose to sustain the plant, and the continued culture of the same soil, brings on a disease in the plant, greatly resembling the blight in wheat, and leaving a propensity in the seeds of cotton, to extend the evil, like the propensity in blighted wheat to extend and multiply, nor have I ever doubted, that in both instances, that the evil had originated, in insect depredations, for although Sir Joseph Banks discovered a fungous attaching itself to blighted wheat, I still believe, that the microscope discovered in that minute parasitic plant, the effects of injury previously received from something that lived, and moved, and had animal being. Fire therefore, I have always believed, and have always acted upon that belief, is the best security against this increasing and extending evil—all the weeds and grass, that are on the land should be burnt upon the surface of the land, leaving no vegetable matter to conceal and protect the germ, and by fermentation, to give heat and life to it; it is the neglect of this course which I think, has been the cause, that this evil, under various names, rot, and rust, and blight, has spread so widely as it has done, within a few years.

There is no plant, that requires the interchangeable husbandry more than the cotton plant, and there is no country, where that husbandry is more essential than in the Southern States. The cotton requires continued cleaning during the droughts of spring, and the heats of midsummer; these cleanings together with the shade and rapid growth of the plant, break up the soil, and leave it to be carried away, by the first violent autumnal rains. The best remedy is to give to the fields of cotton, intermediate crops of grain—as good a series as can well be adopted, is cotton, rye, and wheat where the soil is fit for it, pasture, and again cotton, a more extended rotation might be adopted, but as all root crops should be avoided in series with cotton, this simple tri-annual course, with manure applied during the grain year, to as great extent as may be convenient, will keep the field without material decay. When cotton was first introduced, the growers were misled as to the necessity of this change, by observing that the cotton plant upon new lands, grew large, and gave little fruit, and that it improved for the second and third year in productiveness, they unfortunately pushed the culture too far, until possibly to this cause, many of the diseases that have afflicted it in its growth may be attributed.

In a preceding part of this letter, the probable mean results, for these last 15 years, in growing sea island cotton, has been taken, at 90 dollars, or about 20 pounds sterling to the laborer, and taking as we have already done in this letter, the medium crop of short staple, at 125 lbs. to the English acre, and eight acres of this cotton, as cultivated by the plough, it will give, 1000 lbs. of short staple cotton wool to each laborer employed upon it, which for the last 7 years may have given to the grower, a mean return of 10 cts. to the lb., or 100 dollars for the year's work. There are exceptions, unquestionably, to these estimates, a few men have received much higher prices, for their sea island cotton, and a few men have raised much larger quantities of both descriptions of cotton, to the acre, than are given; but exceptions can never serve as a guide, in conclusions, as to either the wealth, or productiveness of a whole country. The besetting sin of agricultural statements are exaggerations; and this arises from the simplest of all causes. Men do not go about, measuring the fields, and weighing the products of their neighbors, but they leave it to themselves, to measure and weigh. But it too often occurs, that he has done so, in imagination, before he was called to do so, in reality, and vanity mingles with disappointment, in denying his consent to go back, to unravel, to explain, or confirm the result. Why then it may be inquired, has a whole people so readily and so greedily adopted a course of cultivation, leading to so small individual benefit? There are many reasons; but there is one, sufficient to the end. It suits their wandering habits, it requires no great time to grow, it requires no great expense to prepare, and it will command money, less or more, wheresoever grown. But should we here pause to inquire, whether this delusion, will continue for always; whether 5,000,000, of Southern American people, will continue to labor for the benefit of others, rather than for the benefit of themselves, I think they will not, unless cotton gradually rises, to what is its real value. Is it not finer—Is it not lighter—Is it not more easily spun, and more easily woven than other wool? And does it in its various qualities sell for as much? Does it sell for as much as fur, as silk, as flax, or even hemp? It does not; and yet there is not one purpose, to which any one of these materials, can be applied, to which cotton cannot as well, or even better, be applied. From the Court Lady, that is fluttering around the throne of Louis Philip, to the ship that sails across the sea, all are better clothed in cotton, than they can be clothed in any thing else; for the one cannot be more pure or stainless, than the robe she wears and the night dew that falls upon the sails of the other, will not rot or destroy them, but will swell and thicken them, to the wind. Cotton has yet to be applied to many purposes to which it has not yet been applied, if it were possible to suppose, that the supply could keep pace with its multiplying uses; but the American people have at length, reached, in the cotton region, the bounds of the American empire. Tribes of red men, will separate them, from Mexico. The roll of population to the west will be stayed. Within the present limits, the laborer whether white or black, has full employment, and none of them, more unprofitably, than those employed in the cultivation of cotton. Rice gives a better return, sugar in many districts gives a better return, wheat in its appropriate place, gives a better return, indigo, an ancient staple of the country, would give a better return. Those hills that are now wasting awaywith continued summer ploughings, under cotton, will be-

fore many years, be shaded, and protected by mulberry trees, feeding silk worms, that will give a better return, to those, that watch and labor upon them. Cotton must take its real and relative value, among the gifts of God—or its growers will leave the wrangling governments, that have done what they could do to destroy it, to quarrel over its remains.

But the writer of this letter, has no where permitted the pen fully to express, all the mind felt upon the subject. The once generous and gallant men of Spain, had been nigh devoured by sheep; the still more generous and still more gallant men of England, and of Scotland, were in danger of being devoured by sheep, when the growers of cotton, came to the rescue—and how have they been rewarded? Let the legislation, for many years, of England, and of the United States tell.

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It would have been easy to have added to this letter tabular statements, of the progressive increase, in the growth, and in the manufactory, of cotton wool; but every bookseller's shop, in every town, in England, will give them.

THOS. SPALDING,

Of Sapalo Island, near Darien, Georgia.

MARL BANKS AND PAPER BANKS.

To the Editor of the Farmers' Register.

Eastern Shore, Maryland, 23rd Sept., 1834.

Two summers ago, I derived much pleasure and instruction, from reading your Treatise on Calcareous Manures. At the time, I was engaged in clearing and ditching a swamp, in one of my fields. About twelve inches below the surface, I found a stratum of earth, corresponding with the description you give of marl, not calcareous. I tried it by one of the tests you mention, by droping a piece well dried in a tumbler of water, and it fully answered, by crumbling and shooting up sparkles to the surface. I became perfectly satisfied that it contained no calcareous particles, by testing it, by a solution of muriatic acid. Last autumn I sowed the field in wheat, and applied to its improvement a considerable quantity of calcareous marl, and as much putrescent manure as I could collect, and by way of experiment, I carried out a few cart loads of the earth first mentioned. It was spread on a part of the field which had been entirely exhausted by hard cultivation—the land immediately adjoining, I was unable to assist—the product at harvest, where this earth had been spread, was more than double that of the adjoining land. In the spring of 1831, the field above mentioned was seeded in oats and clover, and where the experiment was made, the clover has grown with great vigor, and the sorrel has disappeared. When I again cultivate this field, I intend to apply this marl largely; I have full confidence in its value, and I have no doubt it extends generally through our country, with many other sources of improvement, which might be developed by a little attention and expense. Many of the farmers in this part of the country, who have something to spare after paying expenses and supporting their families, have been fond to place it in the banks. But I am inclined to think, the recent disasters, in some of these institutions, will render them more wary. The best application that a farmer can make, of any little surplus he may have, is to the improvement of his lands. The deposite is always safe, and will pay a good interest. When a farmer places his money in a bank, he is most frequently without a knowledge of the persons he trusts. It often happens that the president, cashier, and active directors of a bank, have but small interest in the institution, beyond the facilities it affords them, for schemes and speculations; and when the bank fails, he learns for the first time that its active agents were bold, desperate speculators—one engaged in building a new town, another in constructing a rail road, and a third in clearing out a gold mine in Mexico. The fruits of many a hard day's toil are thus lost forever, and he is left to seek satisfaction against the defaulters, by an indictment for a conspiracy, which after remaining a decent cooling time in court, generally fails, for defect in the law, or defect in its execution. Farmers like other classes, have their full share of vanity, and some of them in addition to an easy profit, think they deserve consequence from having money vested in bank stock.

Not a great while ago, Simon Placid lost his dwelling by fire. Simon, like his father before him, cultivated his farm on the old three shift system, and deemed himself fortunate in always keeping out of the hands of the sheriff. Having no funds to rebuild his house, he applied to his neighbor, Solomon Thrifty, for a loan of two thousand dollars. Solomon professed much sorrow for his neighbor's misfortune, and consequent discomfort of Mrs. Placid and the children; but his money was all safe in the bank, the interest punctually paid, and he could not break his capital. As the next dividend day approached, Solomon, after calculating the amount, went to bed and soon fell into a slumber, and dreamed that he saw the bank swept from its foundation by a tornado, and the bank notes scattered to the four winds—he started and awoke, and rejoiced that it was only a dream. Next morning the occurrence was remembered, and he thought it strange that such a vagary should have entered his mind in his sleep, as he had never entertained any such apprehensions when awake. He, notwithstanding, felt restless, had but little appetite for his breakfast, and in the course of the morning, rode to the next public landing to get his newspapers. The packet had just arrived and brought the astounding intelligence, that Solomon's bank had failed, and that some of the fraudulent directors, and fraudulent officers, had swept both counter and vaults. In his melancholy ride home, he passed Simon's farm, and for the first time, thought that Simon's naked chimneys were an ugly object in the neighborhood, and that they would have looked better, if Simon's house had been rebuilt and he had his bond for the money.

PEACH AND NECTARINE.

It is useful to distinguish peach and nectarine trees from each other, at an early stage of their growth, when both first produce their blossoms, before fruiting. To effect this, dissect a few of the flowers of the trees about which you doubt; and a tree which produces villose germens always proves a peach tree, and a tree producing germens smooth and shining proves a nectarine tree.—*Gard. Mag.*

COOLEY'S THRASHING MACHINE—EASTERN SHORE IMPROVEMENTS.

To the Editor of the Farmers' Register.

Wye, Queen Ann's County, Eastern Shore, Maryland, 23rd September, 1834.

A thrashing machine was introduced last year into this part of the country, made by S. Cooley, of Philadelphia. I was so much pleased with its performance, that I purchased one, and have used it with much satisfaction and success. I one day made a trial of its power, and thrashed out one hundred and twenty-six bushels of wheat in three successive hours; and during the thrashing season, it did good expeditious work. I think the horse-power peculiarly valuable. It is strong and simple, four horses carry it with ease. The thrasher and horse-power may be removed from farm to farm, and it requires but small skill, and but little expense, to set it up. From the structure of the horse-power, it cannot be conveniently used in a barn, and the wheat falling on an earthen floor, is liable to dust. I understand that the rice growers of the South, have a method of hardening their thrashing floors, and making them firm and solid. Information of the means by which it is done, would be useful to all who use Cooley's machine, and I solicit a communication on the subject through your Register, either from yourself or some other gentleman.

I am pleased to say to you, that a spirit of agricultural inquiry, and improvement, is rising in our part of the country, and that your book on calcareous manures, and your Register, has contributed much to excite it.

Mr. Jeremiah Nicols, of Kent County, by a small alteration of one of Sinclair & Moor's wheat ans, has chaffed more than two hundred bushels of wheat in one hour. This I have his word for, on which entire reliance is to be placed; and I have also seen a certificate from gentlemen who saw the fan work, who are entitled to the fullest confidence.

WM. CARMICHAEL.

APPARATUS FOR ANALYSING MARL, AND THE CARBONATES IN GENERAL.

To the Editor of the Farmers' Register.

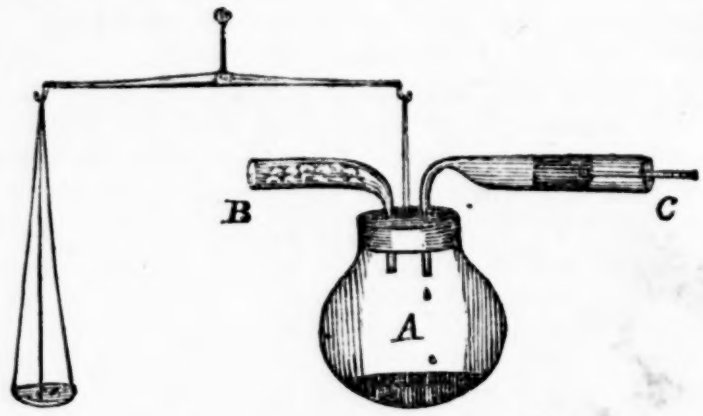
William and Mary College, June 27th, 1834.

The apparatus which I am about to describe, is intended to give greater accuracy and facility to the usual process for determining the quantity of carbonic acid in marl, or in any of the carbonates. By the common method, the two vessels containing severally the marl and the muriatic acid are placed in one of the scales of a delicate balance, and there counterpoised by weights put into the other scale. The acid is then poured upon the marl, and after all the carbonic acid has been discharged, the equilibrium is restored by adding weights to one, or abstracting them from the other scale. In principle, this method is entirely free from objection: but as usually conducted, it cannot be relied upon as accurate. This want of precision arises, in the first place, from the escape of aqueous vapor, along with the carbonic acid which is discharged, thus making a greater weight necessary for restoring the equilibrium, than is due to the quantity of carbonic acid which has escaped —and secondly, from the greater weight of the vessels containing the marl and acid impairing the sensibility of the balance, and thus rendering it impossible to estimate the carbonic acid to small fractions of a grain. The first of these objections has long been obviated in the chemical analysis of the carbonates, by causing the gas as it escapes to pass through a tube containing dried muriate of lime; and the latter has been in some measure removed, by a contrivance of the great practical chemist Rose; which, however, as it is inconvenient and uncertain in the manipulation, I shall not here describe.

The apparatus which I have devised, is, I think, free from these objections, and enables the operator to proceed with great accuracy and despatch. It has the advantage of being very easily constructed, and of being used with a balance that can be procured at a very moderate price. Moreover, the quantity of marl which is necessary for experiment in no case exceeding ten grains, specimens for analysis may very easily be forwarded by letter.

The balance which I use with this apparatus, is a small goldsmith's balance—such as may be procured for a few dollars in New York. It is very light and turns, when unloaded, with the $\frac{1}{100}$th of a grain. My set of weights obtained from Millington in Philadelphia, extends to tenths and hundredths of the grain.

The accompanying figure will convey a distinct idea of the apparatus and mode of using it. One of the scales is removed to admit of suspending the apparatus by a double thread over the hook of the beam. The other is made of something light, as a piece of card. In this way all unnecessary weight upon the beam is avoided, and its sensibility preserved.



A, is a light bulb of glass, blown very thin from a common piece of tube, and about one inch in diameter. A cork is fitted to its mouth, and through this the tapered ends of the bent glass tubes, B and C, are passed air tight; the extremity of the latter extending some distance into the vessel. The tube B, through which the gas escapes, is filled with fragments of muriate of lime. The tube C, which contains the muriatic acid, is furnished with a light piston of cork or cotton, in the centre of which is fixed a rod or handle, made of a small stiff straw. This instrument, when charged with marl and acid, does not weigh more than 120 grains. The whole load of the beam is therefore 240 grains, and it is still sensible to the $\frac{1}{100}$th of a grain.

The mode of proceeding with the analysis is as follows. Five or ten grains of the finely powdered marl is introduced into the vessel A, and then two or three drops of water added, to assist the diffu-

sion of the acid. The small end of the tube C, now removed from the cork, is dipped into some muriatic acid in a wine glass, and the piston moved backwards and forwards until the necessary quantity of acid has been drawn in. The tube is then replaced in the cork, and in this state the instrument is counterpoised by weights in the opposite scale. The piston being then gradually forced in, the acid is injected drop by drop upon the marl, and the gas escapes by the tube B, depositing the aqueous vapor in its passage, on the muriate of lime. Allowing the apparatus to rest until the gas has entirely escaped, and the decomposition is complete, the equilibrium is restored by placing weights upon the clear top of the cork, or by removing weights from the scale. In this way the weight of the disengaged gas is accurately determined, and the proportion of carbonate of lime thence computed.

An analysis of a specimen of marl from James City, just completed, will serve as an illustration of the method. Ten grains of the finely powdered marl was introduced with a little water into the vessel A, the instrument was then charged and equipoised. The acid being injected, the whole was allowed to rest for an hour. The weight lost was 2.91 grains. Increasing this in the ratio of 44 to 100, gives 6.61 grains of carbonate of lime in the 10 grains of marl—or almost precisely 66 per cent.

The frequent calls upon me for the analysis of specimens of marl, first led me to the construction of this apparatus, and I have since found it so convenient and accurate, that I can recommend its adoption to such of your readers as may have a taste for chemical inquiries connected with agriculture. Any ordinary worker in glass will construct the instrument, and skill in manipulating with it may be soon and easily acquired.

WM. B. ROGERS.

[The farmers who are using marl will be greatly indebted to Professor Rogers for the convenient and cheap little apparatus above described—which, judging from his description, not only furnishes the cheapest and most convenient, but likewise the most accurate mode of analysing calcareous manures. It may be easily constructed by any worker in glass—so easily indeed, that Mr. Rogers made his own by the heat of an Argand lamp, using a few common glass tubes as materials. Every farmer who uses calcareous manures ought to have some means for testing their strength, and this seems to be completely within the power of all to obtain, and to make use of, with very little attention. But though the process, as above described, is sufficiently plain to all who have the slightest knowledge of the chemical properties of the substances used, it may appear unintelligible to others; and therefore we hope that the following explanations may be pardoned by those to whom they are altogether useless.

The principle upon which the apparatus works, is the same as that of the more expensive and complicated apparatus of Davy, (described in his *Agricultural Chemistry*) which we have heretofore considered the best—that is, by separating and ascertaining the weight of the carbonic acid combined with the lime of the manure. Every hundred grains of calcareous earth or carbonate of lime, is composed always of similar proportions of lime and of carbonic acid—which proportions, by weight, are 56 parts of lime, and 44 of carbonic acid. Of course, if we know how much weight is lost in 100 grains of earth partly of carbonate of lime, (as marl,) by driving off its carbonic acid, the rule of proportion will show what was the amount of carbonate of lime contained in the sample of earth.

When the muriatic acid reaches the earth in the bulb, it immediately combines with the lime by its greater attraction, and the weaker carbonic acid is disengaged in the form of gas, and escapes into the air through the tube containing the dry muriate of lime—which substance attracts moisture so powerfully, as to retain all that might otherwise pass out with the gas. The same muriate of lime will serve for many experiments, as by being heated in the tube, its dryness is restored previous to every trial. This salt is formed by the combination of muriatic acid with lime—and therefore every experimenter may provide it for himself, by filtering and evaporating the fluid left in this process of decomposing carbonate of lime.]

MEXICAN PIGGERIES.

[The following article furnishes the account of the Mexican piggeries, of which a correspondent made inquiry in a former number of the Farmers' Register. It may serve to amuse our readers—but it is not likely to induce any to place their pigs upon so princely an establishment.]

From Bullock's Travels in Mexico.

"In the piggeries, they will have from 800 to 1000 swine in number confined in styes of well built sheds, about 30 feet deep, with roofs descending very low; and having the entrance through low arches, before which is an open space the whole length of the yard, and about 24 feet wide, in the centre of which is a kind of aqueduct, built of stone, and filled with clean water; supplied from a well at the end of the premises. The hogs can only put their noses into this water through holes in the wall, which prevents their dirtying it, as it passes through the whole division of the yard. This is the only liquid given them: and their food, maize or Indian corn, slightly moistened, and scattered at stated hours on the ground, which in the yard as well as the place where they sleep is perfectly dry and clean. Two Indian lads are employed, from morning till night, in settling disputes, or little bickerings, that may arise among the happy inhabitants of this community, and in singing them to sleep. The boys are chosen for the strength of their lungs, and their taste and judgement in delighting the ears and lulling the senses of this amiable harmonic society;—and succeed each other in chaunting during the whole day, to the great delight and edification of the audience, who seem fully to appreciate the merits of the performers. The proprietor of one of those establishments himself attended us, and explained the use of the various apartments. He assured me that the premises cost him 60,000 dollars, and that his sales amounted to about 2000 dollars per week; indeed, his display of diamonds, and his three splendid carriages with fine horses standing in the yard, bespoke him a man of some opulence and

importance. His stock are bred at a farm belonging to him at Otumba, and driven to Mexico to be fattened, when eight months old.

FORCING EARLY BEANS.

From the Gardener's Magazine.

In the month of November last, when digging the ground where the crop of scarlet runners [beans] had grown, I could not help noticing the large size of the roots; and it occurred to me that, if I took them up, potted them, and kept them in a cold pit during the winter, they might furnish another crop the following spring. I tried the experiment on two of the best roots, potting them, and keeping them in a cold pit till the 1st of February. At that time I put them into a hot-house, in which the average temperature was about 60°. They soon began to send up strong shoots, and to show flower in abundance from the ground upwards. They are now about 12 feet high, and make a very good appearance in a green-house, where they pass with many for a new species of plant. If I had saved thirty or forty roots, and had put them in heat in spring, in the manner done with georginas, and if I had turned them out in the open air about the same time that these plants are turned out, I certainly should have been able to gather kidney beans a month sooner than is done by the usual practice of sowing in the open garden.

ON THE IMPROVEMENT OF AGRICULTURE.

Addressed to the Agricultural Society of Charlotte.

For the Farmers' Register.

There can be no doubt that practical essays are better calculated to promote the interests of agriculture, than mere theoretical opinions. As my practice however, has not been the most successful, and I feel my deficiency in practical operations generally, I shall not attempt to offer any thing in this way, but confine myself to such observations as may seem to me suitable to the present occasion.

We must all deplore the careless and neglected condition of agriculture generally in this and the adjacent counties.

At a time when every effort is making in some of our sister States, and in some of the counties of our own State, to advance the cause of agriculture, by the dissemination of enlightened views on the subject, it is our melancholy lot to witness its decline.

The cultivation of the soil which ought to be looked upon as a source of wealth and independence, in many cases, proves to be the road to poverty and ruin—and rural occupations, instead of being esteemed of the highest importance, are sunk into a state of degradation. Our lands are cultivated as if we had no permanent interest in them, and as if it were a matter of course, that in a few years we were to throw ourselves into, and float along the current of western emigration. Misguided avarice, or an unaccountable apathy seems to operate upon us, and the mandate of a despot could not more effectually drive us from our native soil. The wretched system of cultivation we are pursuing, the exhausting nature of our crops, (corn, wheat, and tobacco,) with scarcely any meliorating process, and the consequent rapid decline in the fertility of our soil, are fast destroying our attachment to our country, and driving us to seek an asylum from poverty and want, in the rich lands of the west. For our country to be loved, (as Burke says) she must be made lovely. But who can say that at this time the agricultural condition of this section presents a lovely aspect? Does it not, on the contrary, present us with many bitter reflections on the past, sad contrasts of the present, and gloomy and desponding apprehensions of the future? But we must not despair. Patriotism bids us exert all our energies, to make Virginia a lovely spot. For it is here that the bones of our fathers rest. Here upon our altars did the pure flame of liberty first blaze up, and hence did the mighty conflagration spread itself, until the bands of British despotism were melted away, America freed, and the world taught the glorious truth, that the *liberty* of the citizen was not inconsistent with *good government*. The same spirit which achieved our liberties still exists in our bosoms. She calls on us to nerve ourselves for a generous effort. Let us not despond. Let not the spirit of patriotism call on us in vain. This Society may expect to be opposed by some, ridiculed by others, and regarded with indifference by the majority. But the patriot is not to be driven from his purpose by trifling difficulties. His aim is high, and he enjoys more real happiness in well-meant endeavors for his country's good, than the cold hearted bigot to his own prejudices can ever taste.

I know that our resources have been weakened and diminished. But well-directed skill and diligence will help to make up for this. Our soil has been impoverished, but still enough remains to enable us to adopt a new system of cultivation. Gloomy as the prospect appears, I do not despair of yet seeing our soil, susceptible of improvement as it is, clothed with verdure. Nature has lavished her favors upon us. Our country is peculiarly adapted to farming—its products are highly diversified—we are not tied down necessarily to any one staple: grain, grass, tobacco, hemp, flax, and the various root crops all grow well. It lies beautifully; is intersected with many fine, bold, navigable streams, and both inland and seaport towns afford a market for our produce of every variety. A sufficient portion of the soil is naturally fertile, and (although much worn) still susceptible of the highest degree of improvement. The climate is one of the most pleasant and salubrious in the world. Every thing in short, but the obstinate prejudices and apathy of our fellow citizens, combines to make it one of the finest spots on the habitable globe.

Why then, it may be asked, with a soil naturally good, and so many and so great advantages, does not the cause of agriculture flourish? In addition to the causes already mentioned, is the pertinaceous adherence to old customs, and a disposition, inherent in man, to tread the path of his fathers. To a certain extent I approve this disposition, but he is not wise, who when he sees the errors of those who have gone before him, does not avoid them—who when he sees the rocks on which they are wrecked, rushes heedlessly on to the same destruction. Our eyes are now fully open to the faults of our predecessors. The ravages which their injudicious cultivation has made on the beauty of our soil, are sufficiently manifest wherever

we go. Our gullies glare horribly upon us, and like the ghost of Banquo, tell of murder. But we will not dwell on those fatal errors of our fathers. They more than paid us for all the wrongs they committed, in handing down a *legacy* that makes even the barren hills rejoice—*liberty—thrice blessed liberty.*

With these views, I shall, to the best of my ability, point out the obvious means of amelioration and improvement.

Our farms are generally too large to look for any thing like fertility throughout. And many of them are so generally exhausted, that years must elapse before they can exhibit one scene of high cultivation and improvement. It seems conceded by those who have enjoyed the most favorable opportunity of testing the efficacy of the grasses, that no calculation can be made upon them, unaided by animal manure, or some foreign substance, such as marl, or gypsum. And such is our distance from the large cities, that we cannot procure the manures which are used so plentifully and profitably by farmers in their immediate neighborhoods. Our dependence then must be chiefly upon the resources of our own farms. Our tobacco crops must be curtailed—our manuring schemes must not be confined exclusively to the tobacco lands. The scene of our manuring operations must be shifted every year, and extended to the utmost reach of our means, and where it is practicable to get plaster, marl, or lime, to add to the amount of product beyond what it cost to procure it, and use it—it ought to be used. Every nook and corner of the country ought to be ransacked to ascertain the existence of calcareous or other mineral substances suitable for manure. No labor ought to be spared in the collection of vegetable substances, to mix with and retain the manures from our stables, farm pens, sheep folds, &c. Every particle of the litter about our out houses, poultry yards, and other places should be carefully collected, and put upon our lands. I doubt not that much more may be done in this way, than is generally supposed. In all the fence corners, feeding places, ditch banks, ponds, &c. resources exist, which are generally entirely lost. Whenever the soil is of a tenacious, close character, containing too much clay, much may be done by the application of sand: where it is too light, clay may possibly increase its fertility. Where it is gullied and washing, deep ploughing and coarse litter may be successfully used. In many situations irrigation will be found a most efficient manure, as draining is in others. In short, a thousand sources exist. Even oak leaves constitute a very valuable manure on close tenacious soils.

When we look at this subject, we must admit that limited as our resources may appear, they are sufficient for more extended application on almost every farm; so that the farmer who does nothing towards the improvement of his soil, is left without excuse. The folly of the plan generally adopted is too evident to require exposure. According to the little observation I have made, the common mode is to put all the litter of the farm upon small tobacco lots, which are thus kept rich at the expense of the whole farm. The most superficial observer must see at once that this is a wretched system—a system which is diminishing every year its own sources, lessening the crops of grain, grasses, &c. and thus breaking up the channels through which its very existence is kept up. And after a while these lots failing of their accustomed supplies of litter, in their turn, become poor, and the whole farm thus managed, soon presents a scene of sterility and waste, and the proprietor is driven by shere necessity (as I said before) to seek an asylum in the alluvial lands of the far West. But let us manure our lands for grain; let us extend our fields of operation, by increased diligence and economy, and change them every year; and thus with the increase of our grain crops will be the increase of our means of extending our operations, the increase of our comforts, and the increase of the beauty, production, and prosperity of our country.

But you are ready to ask, what shall we do for tobacco lands? I answer, that those who have them not, must cease to cultivate the article; and those who have them, must keep them up, by the help of clover and plaster. At a former meeting I advanced the opinion, that lands already rich, may be kept so, by the use of clover; and I doubt not the addition of plaster will raise them to the highest point of fertility. I know it must be long before our tobacco lands generally can be brought to a state so desirable, but every one ought to make it his aim to bring it to this point. We have every encouragement to go on, and however slow our progress, it is of the utmost importance that it be onward.

It is vain and fruitless to rely on the grasses alone, on soils not rich enough to produce them. It is easy matter to keep rich land rich, but he who lives upon poor land, must be content if by the judicious application of his means, he can see a gradual and progressive improvement. Let us then, gentlemen, try what we can do—let us preserve our tobacco lands as well as we can by the help of clover and plaster, and let our future efforts be chiefly directed to the improvement of other lands, and the increased production of articles suitable for sustenance, for man and beast; and thus, as I before said, will our resources for the enlargement of our manuring schemes be proportionably increased, and thus may this ratio of production and extension be carried on, until every waste plain shall become a garden, and every field smile with plenty.

Can the patriot contemplate such a revolution without having his heart thrill with rapture? And while so much is to be done can he sit down quietly, and with folded arms wait for others to perform the task of putting this revolution in motion? No, he cannot. The bare possibility of such a change will command his best exertions. We, gentlemen, have, I hope, associated ourselves for the purpose of aiding to bring about such a revolution. Although our number is as yet small, we have reason to hope we have engaged in the cause with a spirit that will carry us through triumphantly. Let us then, having put our hands to the plough never look back—let us cultivate those social and friendly feelings which a common cause ought to inspire—let us impart all the light we can obtain on the various objects for which we are associated—let us not be discouraged if our progress should be slow, and our difficulties great; but let us press on, determined that we will not relax our exertions until the spirit of enterprise and improvement which now slumbers in the bosoms of our fellow citizens, be roused to efficient operation, and the desolations of our beloved Virginia

shall give place to rich meadows and verdant fields, and all the joys of a highly cultivated and plentiful country. I sincerely believe that the formation of this Society is an important era, and I rejoice to see so much interest excited by the subject in the minds of the public. I confidently look forward to the time when its labors shall command the gratitude of every truly patriotic citizen in this country. In the mean time, let us set our faces like flint to the accomplishment of our grand object, the general advancement of the cause throughout this country.

ON THE CULTIVATION OF FRUIT TREES.

Addressed to the Agricultural Society of Charlotte.

For the Farmers' Register.

The subject to which I invite your attention, is the cultivation of fruit trees. Among all the rural pursuits none can be more interesting than this, whether considered as a means of gratifying our palates, or ornamenting our farms. In this branch of economy, we have been left far behind by some of our sister States. It would doubtless be matter of surprise to some, to see an estimate of the amount of money annually laid out by the people of Virginia for fruit and cider, in the States north of this, which, we hazard the assertion, can be as well raised here, and at less expense, than they can be in those States, on account of our superabundance of land, which enables the planter to spare enough, without curtailing his crops; while they, for the most part, have to appropriate lands to that object, which might be otherwise very profitably cultivated in grain, grass, or root crops.

I need scarcely urge upon the minds of any present, the importance of bestowing some attention to this subject. Many of our best managers, however, regard the subject with so little attention, that it is rare to meet with a good orchard on their farms; and few of our tables are supplied with the choicest varieties of fruit. It has been said that he who makes two blades of grass grow where only one grew before, deserves well of his country. It may be as truly said of him who plants a good orchard, or introduces a new variety of good fruit—for every such introduction adds much to our enjoyment. I know in some instances single trees to afford more good eating than can be procured by ten times the trouble and expense in any other way. A friend of mine has a tree that produces apples of the most delicious flavor, in constant succession, from the first of June till August, affording a plentiful supply for a large family, and frequent treats for his neighbors. The introduction of this tree could not have been attended with much expense, and while affording such an ample supply of fruit, is highly ornamental, and an excellent shade—standing in the yard, and occupying no more ground than would have been taken up by some useless tree,

It would be difficult to account for the negligence of our farmers on this subject. Some impute it to the all-absorbing crop of tobacco, others to the spirit of emigration, but in general, I think it may be imputed to a want of diligence and forecast. None of these causes, however, constitute a sufficient excuse for a total neglect of the matter, especially when we consider that a few hours manual labor at the proper season, will lay the groundwork of an excellent orchard. I cannot deny, however, that a spirit of emigration is the bane of all improvements in rural life; for men are not apt to do much towards such improvements when they calculate on abandoning them in a few years. But it is to be hoped that this spirit is subsiding, and a spirit of improvement gaining ground. When we see on every farm fine orchards of the best fruits, we may conclude that the proprietor loves the soil on which he lives, and the more he does towards such improvements the stronger his attachment becomes. But where this attachment is not cherished, but little of improvement of any sort can be expected. Every man has it in his power to furnish himself with an orchard of the best fruit by a small degree of attention. As I have had some experience in this business, I propose to lay before the Society the results of that experience; hoping that if I present nothing new, I may succeed in exciting the interest and drawing out the views of others more able to give us light on this subject.

I shall, in the first place, invite your attention to the various modes adopted for the propagation of, and raising the trees, and the comparative success attending each mode practised by me.

The apple tree may be successfully raised by budding or grafting, (terms I presume well understood) but grafting with me has been far the most successful. When budded, (or as it is frequently termed inoculated) the body of the tree below the insertion of the bud, is liable to put out suckers, which become troublesome, and hinder the growth of the tree. The bud is more liable to perish than the graft. In preparing stocks for grafting it is very important to provide those raised from the seed, as they are free from suckers, while stocks taken from the roots or sides of old trees are ever sending up shoots from the roots, which are troublesome to destroy, and if not often cut away, seriously impede the growth of the tree. I have found trees grafted on seedling stocks, more certain to live, more vigorous in their growth, and of handsomer shape. When the seedling stocks have been scarce, I have frequently cut the roots in pieces, so as to make every root a stock, with complete success—and this plan is worthy of attention, for stocks are frequently very scarce, and in that case five or six stocks may be obtained from the roots of a small tree.

The peach tree I have raised both by budding, grafting, and planting the stones. When the stones of the best varieties can be readily obtained, I should not hesitate to rely upon them. But all authors on the peach tree concur in the opinion, that there is always uncertainty in getting the genuine kind in this way; and my own experience has taught me that stones from the same tree produce fruit slightly varying from the original in shape, size, and flavor—but I always expect to get some as much improved as others are deteriorated by this plan. But when stones cannot be readily come at, I prefer budding, as more certain as to the kind, more rapid in the growth, and earlier in bearing, while grafting has always proved uncertain, especially on the peach stock. I cannot give greater force to this opinion than by giving the result of an experiment made by me four or five years ago. I obtained from an orchard some twenty-five miles distant, slips nicely cut from many different varieties, to the number of one hundred. I had previously raised stocks from

the peach stones, upon which I grafted ninety of the hundred, when my peach stocks giving out, I was reduced to the necessity of resorting to the wild plum stock, dug up from the roots of old trees. The result of the experiment was that out of the ninety grafted upon the peach stock, (it turning out a dry season) I did not save a single tree, while from the ten grafted on the plum stocks, I obtained five thrifty trees. The result of this experiment I considered conclusive as to the comparative merit of the plum and peach stock as a basis for the peach tree. It is not my purpose to enter into the philosophy of the thing, but will simply remark, that I have found the root of the plum less subject to the depredation of the worm (of which I shall again have occasion to speak) than that of the peach, which may account for the difference in the result of the two modes of grafting. All my experiments, however, in grafting the peach have been unsuccessful, while those in budding have proven less troublesome, more successful, and certain as to the kind. I therefore give the budding a decided preference, as well as on account of the facility it affords of propagating any favorite variety at any time in summer. The best time of budding is from the first to the last of June. In the choice of stocks, I have made numerous experiments. The peach budded on the wild plum stock, has grown too rapidly for the stock, sometimes attaining double the size, and such a weight as brought the head of the tree to the ground.

The pear I have found to succeed much better, grow more thriftily, and bear earlier from the bud than the graft, and is the easiest to raise by budding of all the trees I have raised. In grafting the pear, I have generally failed, but have made no satisfactory discovery of the cause of my failure.

The plum I have raised successfully both by budding and grafting, but prefer grafting, as the most certain, and as affording the finest tree. I have found it difficult to provide suitable stocks for the foreign varieties of plums. The common wild plum of the country not being sufficiently vigorous to keep pace with these varieties, the tree soon becomes too heavy for the size and strength of the stock. The plum raised from the stone rarely produces the same kind of fruit, and is apt to be indifferent.

The apricot may be raised by budding or grafting. My experiments on this tree, have been confined to budding, and have not been generally attended with success. Indeed I have found it very difficult to raise, owing, as I suppose, to the thinness of the bark, and to the fact that the bark is composed of two roots, which are very apt to separate in the operation; and also to the projection of the wood under the bud, which makes it difficult to fit the bud to the wood of the stock without bruising.

I might invite your attention to other varieties of fruit, but I do not wish to occupy too much time on the subject. There are many garden fruits well worthy the attention of the Society, but as those varieties I have mentioned are the most important, I shall confine myself to them, and proceed to point out some of the diseases to which they are subject, with the remedies I have applied.

The apple, so far as it has come under my observation, has but few enemies to contend with. It seems to flourish in all our soils that have sufficient fertility to grow a tree of any kind, and I believe requires nothing but good culture and careful pruning. Injudicious pruning, however, often injures the tree. But few of the insect tribe feed upon the apple tree, and of that few the common caterpillar is the only one that ever seriously injures the tree. It may be found enveloped in great numbers in a web as soon as the leaves begin to grow in the spring. The most effectual mode of destroying them is to go while they are yet young, with a forked stick, and twist the web out, when they are all in it, which will be at all times of the day when the influence of the sun is sensibly felt. Another enemy to the apple tree, especially while in its infancy, is the common hare. They are very fond of the bark of young trees, and frequently destroy them. I have successfully prevented this depredation by occasionally killing one, splitting his body, and rubbing it up and down the tree, so as to leave it bloody, or strongly scented by the flesh. Another remedy equally efficacious is to provide a plenty of corn stalks about two and a half feet long, split them on one side, scrape out the pith, and let the tree into it by opening the split, which will effectually secure the tree.

The peach tree is not so fortunate as the apple. It has enemies at the branch, and another at the root. There is a small black insect that preys on the tree, both above and below ground, commencing its operation of sucking the sap as soon as it begins to flow, and they increase in number, until the tree is literally sucked to death. They are particularly fatal to the tree in its infancy—but they pursue their depredations to the well grown tree, often destroying it after it begins to bear, covering it from the roots to the very top-most branch. Hitherto I have heard of no certain remedy for this evil. I am careful to scrape away any that may be found about my young trees when taken from the nursery to plant out. There is at the root of the tree another equally destructive enemy, more secret in his ravages, yet more in the reach of our means to destroy. This is a worm about an inch long when full grown. The egg is deposited at the surface of the earth, by what is by some called the wasp, from its resemblance to that insect. In the fall it hatches, and at once commences its depredations by perforating through the outercoat to the soft part of the bark next the wood, and in some cases, perforating the wood itself. As they grow larger they descend lower into the root of the tree. In the spring they attain their full size, and about the first of April may be found just at the surface of the earth, adhering to the tree, enveloped in a thin earthy covering, resembling the nest of the dirt dauber, (as it is commonly called) only of a darker complexion. I have never traced it farther than this. My plan for destroying this insect, is to commence early in March examining my trees, and whenever I discover a dark appearance about the root of the tree, occasioned by the gum exuding from the root, always indicating the presence of the worm, I dig away the earth, and with a common pocket knife commence tracing from these gummy appearances, the rout of the destroyer, and never cease my search until I get him into my power. Sometimes a dozen will be found in the roots of one tree, and if they are allowed to remain the

tree is inevitably destroyed. By a careful attention to this plan I have preserved the trees in a considerable orchard, scarcely ever losing one. There is another enemy that confines his ravages to the fruit itself. It effects its work of destruction by perforating the fruit, and depositing its eggs, producing a worm which no sooner hatches than it commences its journey to the stone of the fruit, causing it to wither and fall. This is of all the enemies of our stone fruit, the most destructive, and the most provokingly so, as he blights the fruit when it has escaped the frost. This insect is called the curculio, and may be found after sunset, or in cloudy days, carrying on its work of destruction. It resembles the bug that perforates the chinquepin—that I presume is familiar to most of us. I hope that this subject will continue, as it has done heretofore, to command the attention and researches of the naturalists and orchardists of this and other countries, until some remedy is discovered for the evil; and he who shall make this discovery will merit the thanks of his country. All stone fruit trees are more or less subject to the depredation of the two last mentioned insects.

The pear and plum trees are subject to the ravages of an insect that devours the soft bark between the outer coat and the wood. It is the more obnoxious that its encroachments are not detected until the tree is nearly or quite destroyed, as it does not disturb the outer coat of the bark. By carefully knocking on the body of the tree with the handle of a knife you may ascertain whether the bark is destroyed on the inside, and by stripping it off get at the enemy.

My space will not admit of my pursuing this subject farther. I hope the lovers of good fruit will not omit any opportunity of throwing out useful hints on this branch of our rural pursuits. If there is not enough in the pleasure of eating the fine mellow apple, the sweet juicy peach, the melting pear, the meally apricot, and the many other delicious fruits completely in our reach to stimulate us to exertion on this subject, let us find that stimulus in the delightful task of imparting it to those who have a proper relish for them, by giving all the light we can upon the subject. Let those who have fine varieties impart the means of raising them to those who have them not. Let us enlist the public feeling on the subject. Let us cultivate a taste for horticulture, and the fruits of our labor will amply repay us. We shall have it in our power to regale our friends on what greatly promotes social feelings, gratifies the palate, and gives health and comfort in a thousand ways.

REVIEW OF THE MEMOIRS OF JOHN FREDERIC OBERLIN, PASTOR OF WALDBACH, IN THE BAN DE LA ROCHE.

For the Farmers' Register.

Heroism is not confined to the high places of the world—it sometimes flourishes in the vale of obscurity. Such was the heroism of Oberlin; and it is satisfactory to turn from "a troubled sea of noise and hoarse disputes," to contemplate the quiet, unsophisticated virtues of the pastor of Waldbach.

This little memoir is one of those books which one can hardly read without being made better by the reading.

Oberlin was born at Strasbourg, 31st of August, 1740, just eight years after the birth of Washington. His early life was not varied by any very remarkable incidents. In the year 1766, he entered on a course of study preparatory to accepting a chaplainship in a French regiment. It was at this time that M. Stouber called at the student's lodging for the purpose of inviting him to accept the vacant curacy of the Ban de la Roche.

M. Stouber found young Oberlin in a little attic up three pair of stairs.

"On opening the door, the first object that caught his attention was a small bed standing in one corner of the room, covered with brown paper hangings. "That would just suit the Steinthal," said he to himself. On approaching the bed, he found Oberlin lying upon it, and suffering from a violent tooth-ache, He rallied him about the simplicity of his curtains, and the homeliness of his apartment. "And, pray," continued he, after having taken a survey round the room, "What is the use of that little iron pan that hangs over your table?" "That is my kitchen," replied Oberlin; "I am in the habit of dining at home with my parents every day, and they give me a large piece of bread to bring back in my pocket. At eight o'clock in the evening, I put my bread into that pan, and, having sprinkled it with salt, and poured a little water upon it, I place it over my lamp, and go on with my studies till ten or eleven o'clock, when I generally begin to feel hungry, and relish my self-cooked supper more than the greatest dainties."

Oberlin accepted the call, and in 1767, at the age of twenty-seven, arrived at Waldbach, a village central to the district of which he came to take charge. And here he passed the remainder of his life, the whole of which was indefatigably devoted to the interests of the people of his cure.

I shall refer chiefly to those passages of his life which come within the scope of an agricultural journal, which serve to display his merits as an improver of the agriculture of his country—as a practical engineer—as a *working* reformer.

From the following paragraph it will appear that a more inauspicious field for the efforts of benevolence was perhaps not to be found in all France.

"They were alike destitute of the means of mental and social intercourse; they spoke a rude *patois* resembling the Lorrain dialect, and the medium of no external information; they were entirely secluded from the neighboring districts by the want of roads, which, owing to the devastation of war and decays of population, had been so totally lost, that the only mode of communication, from the bulk of the parish to the neighboring towns, was across the river Bruche, a stream thirty feet wide, by stepping stones, and in winter along its bed; the husbandmen were destitute of the most necessary agricultural implements, and had no means of procuring them; the provisions springing from the soil were not sufficient to maintain even a scanty population; and a feudal service, more fatal than steril land and ungenial climate, constantly depressed and irritated their spirits."

In respect to education, a partial reformation had been effected by M. Stouber, Oberlin's predecessor. How much that reform was demanded, may be judged by the following curious dialogue between Stouber at his arrival, and one of the "old-field" teachers.

"Desiring to be shown the principal school house, he was conducted into a miserable cottage, where a number of children were crowded together without

any occupation, and in so wild and noisy a state that it was with some difficulty he could gain any reply to his inquiries for the master.

"There he is," said one of them, as soon as silence could be obtained, pointing to a withered old man, who lay on a little bed in one corner of the apartment.

"Are you the schoolmaster, my good friend?" inquired Stouber.

"Yes, Sir."

"And what do you teach the children?"

"Nothing, Sir."

"Nothing!—how is that?"

"Because," replied the old man, with characteristic simplicity, "I know nothing myself."

"Why then were you instituted schoolmaster?"

"Why, Sir, I had been taking care of the Waldbach pigs for a great number of years, and when I got too old and infirm for that employment they sent me here to take care of the children."

It remained for Oberlin to renovate education, as he did every thing else—and amidst mountains and sterility, pauperism and rocks, to kindle the rays of knowledge.

Oberlin turned his attention first to the roads, and like Captain Smith at Jamestown, not content with arguments and persuasions, he went to work himself, and aroused the stupid peasants by the magic of example.

"In a country where rocks hanging on the steep declivity of a chain of mountains, and rapid torrents pouring from their summits, are perpetually causing considerable falls of loosened earth, the formation and preservation of roads involves an expense far beyond the resources of a poor and isolated parish; and all the roads belonging to the Ban de la Roche were, consequently, during the greater part of the year absolutely impassable.

To rescue his parishioners from the half savage state in which he found them, he judged it necessary, as a preliminary measure, to bring them into contact with the inhabitants of other districts, further advanced in civilization; and for this purpose to open a regular communication with the high road to Strasbourg, by which means the productions of the Ban de la Roche might find a market, and materials be procured for exercising their industry and ingenuity.

Having, therefore assembled the people, he proposed that they should blast the rocks, and convey a sufficient quantity of enormous masses to construct a wall to support a road, about a mile and a half in length, along the banks of the river Bruche, and build a bridge across it near Rothau.

The peasants were perfectly astonished at the proposition. The project appeared to them totally impracticable, and every one excused himself, on the plea of private business, from engaging in so stupendous an undertaking. Oberlin, still intent on the prosecution of his scheme, endeavored to refute the objections raised on all sides: "The produce of your fields," said he, "will then meet with a ready market abroad; for, instead of being imprisoned in your villages nine months out of the twelve, you will be enabled to keep up an intercourse with the inhabitants of the neighboring districts. You will have the opportunity of procuring a number of things of which you have long stood in need, without the possibility of obtaining them, and your happiness will be augmented and increased by the additional means, thus afforded, of providing comforts for yourselves and your children." But his arguments were concluded with a more touching appeal. He offered them his *own example* in the undertaking. "Let all," said he, "who feel the importance of my proposition, come and work with me."

Oberlin had already traced the plan, and no sooner had he pronounced these words, than, with a pick-axe on his shoulder, he proceeded to the spot; whilst the astonished peasants, animated by his example, forgot their former excuses, and hastened, with unanimous consent, to fetch their tools and follow him. He presently assigned to each individual an allotted post, selected for himself and a faithful servant the most difficult and dangerous places; and, regardless of the thorns by which his hands were torn, and of the loose stones by which they were occasionally bruised, went to work with the greatest diligence and enthusiasm. The emulation awakened by his conduct quickly spread through the whole parish. The increased number of hands rendered an increased number of implements necessary; he procured them from Strasbourg; expenses accumulated; he interested his distant friends, and, through their assistance, funds were obtained; walls were erected to support the earth, which appeared ready to give way; mountain torrents, which had hitherto inundated the meadows, were diverted into courses, or received into beds sufficient to contain them; perseverance, in short, triumphed over difficulties, and, at the commencement of the year 1770, a communication was opened with Strasbourg, by means of the new road, and a neat wooden bridge thrown across the river. This bridge still bears the name of "*Le Pont de Charite.*"

Next he stocked a warehouse in Waldbach with implements of agriculture, and the like necessary articles—established a loan fund, and by sending capable lads to acquire the several trades at Strasbourg, introduced regular bred mechanics, where they had been before unknown. Finally in place of wretched hovels or cabins, he erected cottages, and dug cellars for the preservation of what was then their main sustenance, potatoes.

Above all however, Oberlin strove to improve their mode of agriculture. And here he appealed to their eyes, rather than their ears. Attached to the parsonage house were two gardens, crossed by very public foot paths. In these he set out young fruit trees, and established a nursery. The peasants had to pass through these gardens, in going to their daily work—they could not help observing the contrast between the scanty supply of their own, and the rich produce of their pastor's land. They inquired of him, and he taught them his mode of cultivation.

"The taste for planting trees was thus diffused, and the art of grafting, in which he himself instructed those who wished to understand it, became a favorite employment. The very face of the country, in consequence, underwent a complete change; for the cottages, hitherto for the most part bare and desolate, were surrounded by neat little orchards and gardens; and, in the place of indigence and misery, the villages, and their inhabitants, gradually assumed an air of rural happiness.

So barbarous before Oberlin's time had been the state of the Ban de la Roche, with regard to the most simple agricultural arts, that the old men told him they remembered to have heard from their fathers, that previous to the year 1709, the people of this canton subsisted chiefly upon wild apples and pears. The dreadful famine that took place that year, compelled them to devise means for procuring some other sustenance; and, with this view, they partially cleared away an immense forest, which extended nearly all over the country, and planted a sort of potatoes, *(quemattes,* or *cruattes de tierre* in the *patois,)* which were then first introduced. Owing to the rigorous seasons, and to the soil having been often swept away from the rocks it covered by the rain, this primitive potato had so far degenerated, that, when Oberlin came to the Ban de la Roche, in 1767, fields that had formerly yielded from 120 to 150 bushels, furnished only be-

tween 30 and 50. The people imagined that the ground was in fault, but no means of remedying the evil ever occurred to them. Oberlin, attributing the circumstance to its true cause, pointed out to them the means of recovering the crops, made them acquainted with Parmentier's useful work on the subject, and procured some seed from Switzerland, Holland and Lorrain, to renew the species. The sandy soil of the mountains being peculiarly favorable to their vegetation, abundance soon returned; and potatoes of a superior quality and flavor, soon became, and are to this day, celebrated as the great production of the place, furnishing not only a sufficient store for home consumption, but also a profitable article of exportation.

Believing that great advantages would accrue from the cultivation of leguminous plants and productive herbs, before unknown in that part of the country, Oberlin's next attempt was to raise saint-foin; but, as this plant strikes its root perpendicularly, and the soil of the Ban de la Roche is not deeper than two feet at most on the rocks and sandstone, it did not succeed, though the flax, which he raised from seed imported from Riga, and the Dutch clover, which he also introduced, answered perfectly well, and considerably augmented the resources of the inhabitants.

This success was probably owing in part to the attention he paid to the management of manure, which constitutes a chief secret in agriculture. He not only directed his laborers to the means of enriching it by fermentation, but taught them also that all sorts of vegetable substances, even the leaves of trees, the stalks of rushes, moss and fir apples, might be converted into a useful compost. Acting upon his favorite maxim, "*gather up the fragments, that nothing be lost,*" he also instructed children to tear old woollen rags into pieces, and to cut up old shoes for this purpose; and to facilitate their labors, he paid them sixteen sous for a bushel, and one sou for the smallest quantity they liked to collect."

Oberlin taught his parishioners to convert their unproductive pastures into arable land, and feed their cattle in stalls.

"This conversion of grass into arable land, in a country where rocks were piled upon rocks, and where in some places large masses must be blasted, and in others removed and covered with good soil, before the plough could possibly be employed, required of course a great deal of time and labor; but the industry and zeal with which Oberlin himself began to put in practice every scheme that successively occurred to him, had such an influence upon the minds of his parishioners, that, after the prejudices of the few first years had entirely subsided, they seldom failed to enter into his views, and to imitate his example: the plan was tried, and answered his most sanguine expectations.

In the year 1778, he formed, at the Ban de la Roche, a little Agricultural Society, composed of the more intelligent farmers and the best informed inhabitants of his parish; and, having invited the pastors of the adjacent towns and some of his friends to become members, he connected it with that of Strasbourg, in order to secure the communication of periodical works, and assistance in the distribution of prizes; and the latter Society, wishing to encourage its interesting auxiliary, entrusted to its disposal the sum of two hundred francs, to be distributed among such peasants as should most distinguish themselves in the planting of nursery grounds and in the grafting of fruit trees.

The good effects resulting from this measure induced Oberlin likewise to form a fund, supported by voluntary contributions, for the distribution of prizes to the farmers of each commune, who should rear the finest ox. A short time afterwards, with a view to prepare the rising generation for continuing the works which their fathers had begun, and to give the opportunity of acquiring useful information, he commenced the plan of devoting two hours every other Thursday morning to a familiar lecture on the subjects of agriculture and of useful science.

Such, indeed, was his assiduity, that not a year rolled away in which some astonishing improvement was not effected in the condition or the morals of his people; and the surrounding districts beheld with admiration the rapid progress that civilization was continually making, in the once neglected and apparently forsaken Steinthal."

Oberlin established in the Ban de la Roche, an admirable system of education. He in those sequestered mountains was the first to adopt the famous Infant Schools. In each of five villages he founded public schools; and once a week he in person examined and taught all the children collected together. He established a circulating library, and awarded prizes to masters and scholars. He drew up an almanac, divested of astrological stuff, and adapted to the wants of his people. Among other things he taught them botany, and explained to them the uses of their native plants. After he had lived in the Ban de la Roche thirty years, we have in a letter written by an English visiter, the following sketch of the patriarchal curate, and his house.

"The following morning we set off to return the visit which he had paid us on the preceding day. We found the worthy pastor in his morning gown; it was plain, but whole and clean. He was just on the point of concluding a lecture; his pupils had, like their master, something soft, indeed almost heavenly, in their look.

"The house stands well, and has, from the garden side, a romantic view; in every part of it that kind of *elegance*, which is the result of order and cleanliness, prevails. The furniture is simple; yet it suggests to you that you are in the residence of no ordinary man; the walls are covered with maps, drawings, and vignettes, and texts of Scripture are written over all the doors. * * * * * * *

His study is a peculiar room, and contains rather a well chosen, than numerous, selection of books in French and German, chiefly for youth. The walls are covered with engravings, portraits of eminent characters, plates of insects and animals, and colored drawings of minerals and precious stones; it is, in short, literally papered with useful pictures relative to natural history and other interesting subjects." * * *

"I am writing this at his table, whilst he is busy preparing leather gloves for his peasant children. His family are around him, engaged in their different avocations; his eldest son, Frederic, is giving a lesson to some of the little ones, in which amusement and instruction are judiciously blended; and the dear father, without desisting from his employment, frequently puts in a word. He took me this morning into his workshop, where there is a turner's lathe, a press, a complete set of carpenter's tools, also a printing-press, and one for book-binding. I assisted him in coloring a quire of paper, which is intended for covers of school-books. He gives scarcely any thing to his people but what has been, in some measure, prepared by his own or his children's hands.

"He will never leave this place. A much better living was once offered to him 'No,' said he, 'I have been ten years learning every head in my parish, and obtaining an inventory of their moral, intellectual and domestic wants; I have laid my plan. I must have ten years to carry it into execution, and the ten following to correct their faults and vices.'

"Pastor Oberlin is too modest and generous not to bear testimony to the worth of his predecessor, who had begun to clear this wilderness, and to raise the superstructure, which he has so beautifully completed.

"Yesterday, I found him encircled by four or five families who had been burnt out of their houses; he was dividing amongst them articles of clothing, meat, money, books, knives, thimbles, and colored pictures for the children, whom he placed in a row according to their ages, and then left them to take what they preferred."

M. le Comte Francois de Neufchâteou on proposing a gold metal to Oberlin for services rendered during more than half a century, to agriculture in particular, and mankind in general, thus addresses himself to the Royal and Central Agricultural Society of Paris.

"If you would behold an instance of what may be effected in any country for the advancement of agriculture and the interests of humanity," said he, when addressing the Society upon this occasion, "quit for a moment the banks of the Seine, and ascend one of the steepest summits of the Vosges mountains. Friends of the plough, and of human happiness, come and behold the Ban de la Roche! Climb with me the rocks so sublimely piled upon each other, which separate this canton from the rest of the world, and though the country and the climate may at first sight appear forbidding, I will venture to promise you an ample recompense for the fatigue of your excursion.

"As for myself, after having formed the administration of the department of the Vosges, in 1790, and presided over it, in 1791, I had, in 1793, to travel over those mountains as a commissioner of the government, at the very period when the parishes of Rothau and Waldbach, before that time dependant on the principality of Salm, were united to the department. I have, therefore, been long acquainted with the valuable services rendered, for more than fifty years, to the Ban de la Roche, by John Frederic Oberlin. Ever since that time, and to the advanced age of seventy-eight, he has persevered in carrying forward the interesting reformation first suggested and commenced by his virtue, piety and zeal. He has refused invitations to more important and more lucrative situations, lest the Ban de la Roche should relapse into its former desolate state; and by his extraordinary efforts and unabated exertions, he averted from his parishioners, in the years 1812, 1816, and 1817, the horrors of approaching famine.*

"Such a benefactor of mankind deserves the veneration and the gratitude of all good men; and it gives me peculiar pleasure to present you with the opportunity of acknowledging, in the person of M. Oberlin, not a single act, but a whole life, devoted to agricultural improvements, and to the diffusion of useful knowledge amongst the inhabitants of a wild and uncultivated district.

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"We have already ascertained that there is in France uncultivated land sufficient for the formation of five thousand villages. When we wish to organize these colonies, Waldbach will present a perfect model; and, in the thirty or forty rural hamlets which already exist, there is not one, even amongst the most flourishing, in which social economy is carried to a higher degree of perfection, or in which the annals of the Ban de la Roche may not be studied with advantage."

* The new crop of potatoes that Oberlin had introduced, formed the principal subsistence of the people during those disastrous years, when the season was so cold and rainy that they could not get in two-thirds of the corn at all; and the scarcity so great, that poor little children, exhausted with hunger, were seen to drop down in the streets. A sack of wheat during that time of distress rose to 145 francs, and the potatoes to nearly one sou apiece.

The precise acquaintance which the inhabitants of the Ban de la Roche had acquired, through Oberlin's assistance, with the vegetable productions of their canton, was believed to be the means of preventing the most distressing diseases.

Perhaps in closing this little book some ingenuous but romantic reader may sigh for another Ban de la Roche, where, nestled among mountains, he might aspire to the obscure heroism of the curate of Waldbach. It may be that in Virginia there are none who live upon wild apples, or speak a vile patois; yet if defects, disadvantages, and drawbacks be *desiderata*, on this score perhaps, in some parts of this state, there will be found small ground for complaint. To diminish the sources of human ill-being, and multiply the sources of human well-being, is a field, every where, without limit: and if there were only an Oberlin in each county—in each parish in Virginia, how soon she would start like magic out of the ashes of her present decay!

Oberlin seems to have formed his plans by somewhat of a military *coup d'œil*. He had a firm confidence in himself—a strong decision of character. He had an untiring industry and patience of detail. He understood the maxim, that small causes produce grand effects. He was a man of minutiæ and particulars. He knew that "many a little makes a mickle"—that masses are made up of mites.

While Oberlin was carrying into execution this beautiful system of improvements, France became the theatre of revolution, and the most sanguinary anarchy. But the fury of civil war never reached the peaceful secluded district of the Ban de la Roche. Encircled by mountains and the guardianship of Oberlin, the people of the Steinthal escaped unhurt amid the billows of national turmoil.

In our own country is it not to be lamented, that our ears are so often saluted with the din of politics? Does the happiness of the people depend on every wind and hollow blast that issues from the the Æolian cave? Is there nothing worthy of human concern but politicians and politics?

"In every government though terrors reign,
Though tyrant kings, or tyrant laws restrain,
How small, of all that human hearts endure,
That part which kings or laws can cause or cure!
Still to ourselves in every place consigned,
Our own felicity we make or find.
With secret course that no loud storms annoy,
Glides the smooth current of domestic joy."

A Vasa may free his country—a Washington make his country independent—but it takes an Oberlin to make his country happy.

It was Oberlin's fortune to be a cotemporary of Napoleon. Napoleon published his warlike bulletins from the field of battle, and dated his imperial decrees at the palaces of dethroned monarchs and the capitals of subjugated kingdoms.

Oberlin issued his little circulars from the parsonage at Waldbach, to the villagers, directing them when and how to set out, and trim their fruit trees.

Napoleon's rewards were sceptres and crowns—triumphal arches—the roar of artillery, and the acclamations of the multitude.

Oberlin's reward was smiles and tears of gratitude from those whose happiness was his.

Napoleon amid the pomp and magnificence of the Tuilleries was restless and disturbed—his heart rent with the fury of contending passions.

Oberlin in the parsonage was heard to say—"Yes, I am happy."

The one died on a volcanic rock in the ocean—

lonely and desolate—far from the scenes of his glory and his power, descending to his grave amid lurid clouds—followed by the admiration and curses of mankind. Oberlin's death was a quiet sunset—the hushed serenity of closing day. He was followed by the tears of his parishioners—lamenting in inconsolable bitterness, the irreparable loss of their curate—their guide—their father—weeping for Oberlin.

"During the four days that intervened between his decease, and the simple and affecting ceremony which consigned his remains to their last home, heavy clouds rested on the surrounding mountains, and the rain poured down in incessant torrents; this circumstance did not, however, prevent the inhabitants of the Ban de la Roche, of all ages and conditions, nearer or more remote, from coming to pay a last tribute of respect to the remains of their "dear father," whose venerable countenance they were permitted to see through a glass lid, which, under the direction of Mr. Legrand, covered the coffin, which was placed in his study.

Early in the morning of the day fixed on for the interment, the clouds cleared away, and the sun shone with its wonted brilliancy. As they left the house, the president of the Consistory of Barr, the Rev. Mr. Jaeglé, placed the clerical robes of the late pastor on his coffin, the vice-president placed his Bible upon it, and the mayor affixed to the funeral pall the decoration of the Legion of Honor. At the conclusion of this ceremony, ten or twelve young females, who had been standing around the bier, began to sing a hymn in chorus, and at two o'clock the procession took its departure, the coffin being borne by the mayors, elders, and official magistrates. In front of it, walked the oldest inhabitant of the Ban de la Roche, carrying a cross, which Louise had given him, to plant on the tomb, and on which the words, *Papa Oberlin*, were engraved in open letters.

So numerous was the concourse of people assembled on the occasion, that the foremost of the train had already reached the church of Foudai, where the interment was to take place, before the last had left the parsonage, although the distance was nearly two miles. The children of the different schools formed part of the melancholy procession, chanting, at intervals, sacred hymns, selected and adapted for the occasion. At the moment of their approaching the village, a new bell, presented by Mr. Legrand in commemoration of this day of general mourning, was heard to toll for the first time, and to mingle its melancholy sound with that of all the bells in the valley. The burying ground was surrounded by Roman Catholic women, all dressed in mourning, and kneeling in silent prayer. On arriving at the church, the coffin was placed at the foot of the altar, and as many persons entered as the little edifice would contain, though more than three-fourths of the company had to remain in the churchyard, and the adjoining lanes. Notwithstanding the pressure of so immense a multitude, the utmost order and solemnity prevailed. Several females, who could find room no where else, sat down on the steps of the altar, leaning with melancholy affection against the coffin, as though anxious to cling to the very ashes of one whom they had so much revered and loved. Many distinguished individuals were present on the occasion and several Roman Catholic priests, dressed in their canonicals, took their seats among the members of the Consistory, and evidently participated in the general grief.

The most touching incident in this extract, and that which speaks most loudly for the purity of his religion and virtue, is the fact that the protestant pastor Oberlin's burial was attended by Catholic priests and their parishioners, all sharing the profound grief of his own flock, and evincing the same veneration for the true christian, whose grave they surrounded. Thus to conquer (in himself as well as in other persons) religious bigotry and sectarian intolerance and hatred, was perhaps, the greatest and most difficult of all his noble works, and which would alone serve as the highest eulogy on his life, and the most unquestionable proof of his exalted, yet meek and humble virtues.

RICHMOND, FREDERICKSBURG AND POTOMAC RAILWAY.

From the Richmond Compiler.

The surveys which have been made for the route of this railway, ascertain that the distance between Richmond and Fredericksburg by a direct line from the boundary of one corporation to that of the other, is about 51 miles; and that a good route can be obtained for the railway with an increase of distance of not more than 8 miles. Indeed there are two routes open for the choice of the Company; one surveyed last winter passing over the Pamunkey below the junction of the North and South Anna, and also passing by the Bowling Green; the other, more recently surveyed, crossing the branches of the Pamunkey and passing west of the Bowling Green. On each of these routes, the owners of lands are generally willing to allow the rail road to be conducted through them without any charge for the land, or any claim for damages. On each there is sufficient supply of timber and the distance between the two is not very great. By the Bowling Green route it is 59 miles, and by the other 57½ miles. Some further examinations will be requisite to ascertain the relative expenses.

Until the examinations are completed, the Board of Directors will be unable to determine upon the course the road should take from the Pamunkey to Fredericksburg. As to the course from Richmond to the Pamunkey, there was no difficulty in deciding. A line has been fixed upon, which will be equally proper whether one route or the other be taken beyond the Pamunkey. Passing within three and a half miles of the coal mines, in the upper part of Henrico, the Company will be enabled to make a branch from their road to the mines, and thus bring to market a large supply of coal. By this the citizens of Fredericksburg as well as those of Richmond, will be essentially benefitted.

From the spirit in which this enterprise is conducted the happiest results may be anticipated. Already the Board have directed the Engineer to put under contract, in December, the whole line from Richmond to the Pamunkey. And in fourteen months this portion of the road will probably be in use. In conclusion, it may be remarked, that every thing thus far tends to show that the quantity of produce, and articles to be transported upon the road, will be much greater than was originally supposed. Our city will derive from the work much more benefit than is generally believed.

A PROLIFIC COW.

A rather remarkable zoological phenomenon occurred upon Tuesday morning last, at the village of Redding. A cow, belonging to a woman there, produced no less than *four* calves, (three queys and a bull,) which, with the mother, are doing well.—*Stirling Journal*, 1834.

DISEASES OF THE INTESTINES OF HORSES.

From the Library of Useful Knowledge—Farmer's Series.

These form a very important part of horse surgery, and many erroneous notions are prevalent respecting them. The first disease we will consider is

Spasmodic Colic.

We have said, that the passage of the food through the intestinal canal is effected by the alternate contraction and relaxation of the muscular coat of the intestines. When that action is simply increased through the whole of the canal, the food passes more rapidly, and purging is produced; but the muscles of every part of the frame are liable to irregular and spasmodic action, and the muscular coat of some portion of the intestines may be thus affected. A species of cramp may attack a portion of the intestines. The spasm may be confined to a very small part of the canal. The gut has been found, after death, strangely contracted in various places, contraction not extending above five or six inches in any of them. In the horse, the ileum is the usual seat of this disease. It is of much importance to distinguish between spasmodic colic and inflammation of the bowels, for the symptoms have considerable resemblance, although the mode of treatment should be very different.

The attack of colic is usually very sudden. There is often not the slightest warning. The horse begins to shift his posture, look round at his flanks, paw violently, strike his belly with his feet, lie down, roll, and that frequently on his back. In a few minutes the pain seems to cease, the horse shakes himself, and begins to feed; and, on a sudden, the spasm returns more violently, every indication of pain is increased, he heaves at the flanks, breaks out into a profuse perspiration, and throws himself more violently about. In the space of an hour or two, either the spasms begin to relax, and the remissions are of longer duration, or the torture is augmented at every paroxysm, the intervals of ease are fewer and less marked, and inflammation and death supervene.

Of the symptoms by which it may best be distinguished from inflammation of the bowels, we shall speak when we treat of that disease. Among the causes of colic are, the drinking of cold water when the horse is heated. There is not a surer cause of violent spasm than this. Colic will sometimes follow the exposure of a horse to the cold air, or a cold wind after violent exercise. Green meat, although, generally speaking, most beneficial to the horse, yet given in too large a quantity, or when the horse is hot, will frequently produce gripes. In some horses there seems to be a constitutional predisposition to colic. They cannot be hardly worked, or exposed to unusual cold, without a fit of it. In many cases, when these horses have died, stones have been found in some part of the alimentary canal.

Fortunately, we are acquainted with several medicines that allay these spasms; and the disease often ceases almost as suddenly as it appeared. Turpentine is one of the most powerful remedies, especially if given in union with opium. Three ounces of spirit or oil of turpentine, with an ounce of laudanum, given in a pint of warm ale, will frequently have an almost instantaneous effect. Even a small quantity of fluid will seldom be detained in the stomach, but will pass through the ileum to the cœcum or water-stomach, and in this passage will come in immediate contact with the spasmed part.

If relief be not obtained in half an hour it will be prudent to bleed, because the continuance of violent spasm will produce inflammation. Some practitioners bleed at first, and it is far from bad practice; for although the majority of cases will yield to turpentine, opium, and aloes, an early bleeding may occasionally prevent the occurrence of inflammation, or at least mitigate it. If it be clearly a case of colic, half of the first dose may be repeated, with a full ounce of Barbadoes aloes dissolved in warm water. The stimulus produced on the inner surface of the bowels by the purgative may counteract the irritation which caused the spasm. The belly should be well rubbed with a brush or warmed cloth, but not bruised and injured by the broom-handle rubbed over the belly by two great fellows with all their strength. The horse should be walked about, or trotted moderately. The motion thus produced in the bowels, and the friction of one intestine over the other, may relax the spasm, but the hasty gallop may speedily cause inflammation to succeed to colic. Clysters of warm water, or containing a solution of aloes, will be injected. The patent syringe will here be most useful.

When relief has been obtained, the clothing of the horse, saturated with perspiration, should be removed, and fresh, dry clothing substituted. He should be well littered down in a warm stable or box, and have bran mashes for the two or three next days, and drink only lukewarm water.

Some persons give gin, and even gin and pepper, in cases of gripes. This, however, is a practice to which we strongly object; it may be useful, or even sufficient, in ordinary cases of colic, but if there be any inflammation or tendency to inflammation, it cannot fail to be highly injurious.

Calculi, or stones in the intestines.

We have mentioned these as a cause of colic in horses that are subject to frequent attacks of it. Some indigestible substance lodges in the cœcum or colon: earthy, or half-digested vegetable matter gradually accumulates around this, and a ball, weighing many pounds, is sometimes formed. This will produce colic, or obstruct the passage of the gut, or, by its pressure, produce inflammation; but as there are few or no symptoms by which the presence of these stones is clearly indicated, and few, or rather, no certain means, by which they may be removed, we will pass on to an occasional consequence of colic.

Intususception of the intestines.

The spasmodic action of the ileum long continued, may be succeeded by an inverted action from the cœcum towards the stomach, more powerful than the natural action; and the contracted portion of the intestine is thus forced into a portion above it that retains its natural calibre; and the irritation caused by this increases the action, until more is forced in, and an obstruction is formed which no power can overcome. Even the natural motion of the bowels will be sufficient to produce intususception, when the contraction of a portion of the ileum is very great. There are no symp-

toms to indicate the presence of this, except continued and increasing pain; or if there were, all our means of relief would here fail.

Entanglement of the bowels.

This is another and more singular consequence of colic. Although the ileum is enveloped in the mesentery, and its motion to a considerable degree confined, yet under the spasm of colic, and during the violence with which the animal rolls and throws himself about, portions of the ileum become so entangled as to be twisted into nooses and knots, drawn together with a degree of tightness scarcely credible. Nothing but the extreme and lengthened torture of the animal can lead us to suspect that this has taken place, and, could we ascertain its existence, there would be no cure.

Inflammation of the bowels.

There are two varieties of this malady. The first is inflammation of the external coats of the intestines, accompanied by considerable fever and costiveness. The second is that of the internal or mucous coat, usually the consequence of an overdose of physic, and accompanied by violent purging. We will here speak of the first of these affections. It has been divided into inflammation of the peritoneal coat, and that of the muscular: but the causes, symptoms, and treatment of both are so much alike, that it would be raising unnecessary difficulties to endeavor to distinguish between them. Inflammation of the external coats of the stomach, whether the peritoneal or muscular, or both, is a very frequent and fatal disease. It speedily runs its course, and it is of great consequence that its early symptoms should be known. If the horse has been carefully observed, restlessness and fever will have been seen to precede the attack; in many cases a direct shivering fit will be observed; the mouth will be hot, and the nose red. The horse will soon express the most dreadful pain by pawing, striking at his belly, looking wildly at his flanks, groaning and rolling. The pulse will be quickened and small; the ears and legs cold; the belly tender and sometimes hot; the breathing quickened; the bowels costive; and the horse becoming rapidly and fearfully weak.

It may be useful to give a short table of the distinguishing symptoms of colic and inflammation of the bowels, because the treatment recommended for the former would often be fatal in the latter.

Colic.

Sudden in its attack.
Pulse rarely much quickened in the early period of the disease, and during the intervals of ease: but evidently fuller.
Legs and ears of the natural temperature.
Relief obtained from rubbing the belly.
Relief obtained from motion.
Intervals of rest.
Strength scarcely affected.

Inflammation of the bowels.

Gradual in its approach, with previous indications of fever.
Pulse very much quickened, but small, and often scarcely to be felt.
Legs and ears cold.
Belly exceedingly tender and painful to the touch.
Motion evidently increasing the pain.
Constant pain.
Rapid and great weakness.

The causes of this disease are, first of all, and most frequently, sudden exposure to cold. If a horse that has been highly fed, carefully groomed, and kept in a warm stable, be heated with exercise, and have been for some hours without food; and in this state of exhaustion be suffered to drink freely of cold water, or be drenched with rain, or have his legs and belly washed with cold water, an attack of inflammation of the bowels will often follow. An overfed horse subjected to severe and long continued exertion, if his lungs were previously weak, will probably be attacked by inflammation of them; but if the lungs were sound, the bowels will on the following day be the seat of disease. Stones in the intestines are an occasional cause of inflammation, and colic neglected, or wrongly treated, will terminate in it.

The treatment of inflammation of the bowels, like that of the lungs, should be prompt and energetic. The first and most powerful means of cure will be bleeding. From six to eight or ten quarts of blood should be taken as soon as possible, and the bleeding repeated to the extent of four or five quarts more if the pain be not relieved, and the pulse have not become rounder and fuller. The speedy weakness that accompanies this disease should not deter from bleeding largely. It is the weakness that is the consequence of violent inflammation of these parts, and if that inflammation be subdued by the loss of blood, the weakness will disappear. The bleeding should be effected on the first appearance of the disease, for there is no malady that so quickly runs its course.

Next to bleeding will follow clysters. Although the bowels are usually confined, we cannot administer a strong purgative;* the intestines are already in far too irritable a state. The clyster may consist of warm water, or very thin gruel, in which half a pound of Epsom salts, or half an ounce of aloes has been dissolved, and too much fluid can scarcely be thrown up. If the common ox-bladder and pipe be used, it should be frequently replenished: but with Reed's patent pump, already referred to, sufficient may be injected to penetrate beyond the rectum, and reach to the colon and cœcum, and dispose them to evacuate their contents. The horse may likewise be encouraged to drink plentifully of warm water or thin gruel; and draughts, each containing a couple of drachms of dissolved aloes, may be given every six hours, until the bowels are freely opened.

Next, it will be prudent to endeavor to excite considerable external inflammation, as near as possible to the seat of internal disease, and therefore the whole of the belly should be blistered. In a well-marked case of this inflamation, no time should be lost in applying fomentations, but the

* The human practitioner gives, under this disease, and with advantage, very powerful doses of purgative medicine; and he may be disposed to demur to the cautious mode of proceeding we recommend with regard to the horse. Although we may not be able to give him a satisfactory theoretical reason in defence of our treatment, we can appeal to the experience of every veterinary surgeon, that a strong dose of physic given in inflammation of the bowels would be certain poison.

blister be at once resorted to. The tincture of Spanish flies, whether made with spirit of wine or turpentine, should be well rubbed in. The legs should be well bandaged, to restore the circulation to them, and thus lessen the flow of blood to the inflamed part, and for the same reason the horse should be warmly clothed, but the air of the stable or box should be cool.

No corn or hay should be given during the disease, but bran-mashes, and green meat if it can be procured. The latter will be the best of all food, and may be given without the slightest apprehension of danger. When the horse begins to recover, he may get a handful of corn two or three times in the day, and, if the weather be warm, may be turned into a paddock for a few hours in the middle of the day. Clysters of gruel should be continued for three or four days after the inflammation is beginning to subside, and good hand-rubbing applied to the legs.

The second variety of inflammation of the bowels affects the internal or mucous coat, and is generally the consequence of physic given in too great quantity, or of an improper kind. The purging is more violent, and continues longer than was intended; the animal shows that he is suffering great pain; he frequently looks round at his flanks; his breathing is laborious, and the pulse is quick and small; not so small, however, as in inflammation of the peritoneal coat, and, contrary to some of the most frequent and characteristic symptoms of that disease, the mouth is hot, and the legs and ears are warm. Unless the purging is excessive, and the pain and distress great, we should hesitate at administering any astringent medicine at first. We should plentifully administer gruel, or thin starch, or arrow-root, by the mouth and by clyster, removing all hay and corn, and particularly green meat. We should endeavor thus to sheath the irritated surface of the bowels, while we permitted any remains of the medicine to be carried off. If, however, twelve hours should pass, and the purging and the pain remain undiminished, we should continue the gruel, but add to it chalk, catechu, and opium, in doses of an ounce of the first, a quarter of an ounce of the second, and two scruples of the last, repeated every six hours. As soon as the purging begins to subside, the astringent medicine should be lessened in quantity, and gradually discontinued. Bleeding will rarely be necessary unless the inflammation be very great, and attended by symptoms of general fever. The horse should be warmly clothed, and placed in a warm stable, and his legs should be hand-rubbed and bandaged.

Violent purging, and attended with much inflammation and fever, will sometimes occur from other causes. Green meat will sometimes purge. A horse worked hard upon green meat will scour. The remedy is change of diet, or less labor. Young horses will scour, and sometimes without any apparent cause. Astringents should be used with much caution here. It is probably an effort of nature to get rid of something that offends. A few doses of gruel will assist in effecting this purpose, and the purging will cease without astringent medicine.

Some horses that are not *well-ribbed home*, (having too great space between the last rib and the hip-bone,) are subject to purging if more than usual exertion is required from them. They are recognised by the term of *washy* horses. They are often free and fleet, but destitute of continuance. They should have rather more than the usual allowance of corn, with beans, when at work, and a cordial ball, with one drachm of catechu, and ten grains of opium will often be serviceable either before or after a journey.

Worms.

Worms of different kinds inhabit the intestines; but except when they exist in very great numbers, they are not so hurtful as is generally supposed, although the groom or carter may trace to them hidebound, and cough, and loss of appetite, and gripes, and megrims, and a variety of other ailments. Of the origin or mode of propagation of these parasitical animals we will say nothing; neither writers on medicine, nor even on natural history, have given us any satisfactory account of the matter.

The long white worm *(lumbricus teres)* much resembling the common earth-worm, and, being from six to ten inches long, inhabits the small intestines. It is a formidable looking animal, and if there are many of them they may consume more than can be spared of the nutritive part of the food or the mucus of the bowels; and we think that we have seen a tight skin, and rough coat, and tucked up belly, connected with their presence. They have then, however, been voided in large quantities, and when they are not thus voided we should be disposed to trace these appearances to other causes. A dose of physic will sometimes bring away almost incredible quantities of them. Calomel is frequently given as a vermifuge. The seldomer this drug is administered to the horse the better. It is the principal ingredient in some quack medicines for the expulsion of worms in the human subject, and thence, perhaps, it came to be used for the horse; but in him we believe it to be inert as a vermifuge, or only useful as quickening the operation of the aloes. When the horse can be spared, a strong dose of physic is an excellent vermifuge, so far as the long round worm is concerned; but perhaps a better medicine, and not interfering with either the feeding or work of the horse, is two drachms of emetic tartar, with a scruple of ginger, made into a ball, with linseed meal and treacle, and given every morning half an hour before the horse is fed.

A smaller, darker colored worm, called the needle worm, or *ascaris*, inhabits the large intestines. Hundreds of them sometimes descend into the rectum, and immense quantities have been found in the cœcum. These are a more serious nuisance than the former, for they cause a very troublesome irritation about the fundament, which sometimes sadly annoys the horse. Their existence can generally be discovered, by a small portion of mucus, which hardening, is converted into a powder, and is found about the anus. Physic will sometimes bring away great numbers of these worms, but when there is much irritation about the tail, and much of this mucus indicating that they have descended into the rectum, an injection of a quart of linseed oil, or of an ounce of aloes dissolved in warm water, will be a more effectual remedy.

The tape worm is seldom found in the horse.

DESULTORY OBSERVATIONS ON THE CONDITION OF AGRICULTURE IN VIRGINIA, AND THE MEANS FOR ITS IMPROVEMENT.

To the Editor of the Farmers' Register.

I have not the pleasure of a personal acquaintance with yourself, but am a subscriber to the "Farmers' Register," and hope that, while the enclosed amount for my arrearages is forwarded, you will not consider the few observations that accompany it, as expressive of the interest which I feel in your undertaking and efforts as the editor of that invaluable periodical, as inexcusably obtrusive. There is no debt, I assure you, which I pay with more cheerfulness, and none of my pecuniary expenditures are made under a fuller belief of receiving an ample and almost immediate equivalent than those which are incurred in the expense of procuring the able agricultural journal which you have the honor of presenting to the public. My object is not to offer adulation, but to afford you, if you will accept it, my humble *mite* of encouragement in the laudable enterprise (as I conceive it to be) in which you have embarked. Yours, if I mistake not, is the first publication of the kind in our country, which has excited any considerable degree of attention south of the Potomac, and has appeared to me, from its commencement, to be sustained with an ability not exceeded by any similar publication to which I have had access, (and I have seen several,) that has issued from any direction, or originated in any quarter of the world. My profession is not a secular, but a sacred one, and while consistency and conviction both constrain me to *magnify my office*, and to claim for it, in its bearings on the happiness of the human race, the superiority over all other occupations which engage the attention of men, truth and candor at the same time oblige me to acknowledge that, in *the peculiar circumstances of this country at present*, the individual, who shall fill with respectability the station which you occupy, has the power, in my humble judgement, to exert a more salutary and extensively lasting and beneficial influence, than any other that can be mentioned, whether his employment be that of a literary teacher, or statesman, or lawyer, or physician, or preacher. Agriculture lays at the foundation of every thing useful, or comfortable, or desirable in human life. No nation or people can be permanently prosperous or thriving, whose agricultural interests are neglected. *The profits of the earth are for all, and the king himself is served of the field.* The professional characters to which I have alluded, can have no opportunity or scope for exertion on a large scale, in a country that is not an agricultural one, and for the plain and sufficient reason, that none but an agricultural country can ever become very populous. A sparse population is the necessary result of ignorance, inexperience, and indifference in the business of agriculture; and to suppose that professional men can find useful and profitable employment in a country of but few inhabitants, would be as unreasonable as to expect that animals will fatten on a meagre subsistence. I am pleased that, in connexion with others, you have succeeded in establishing some highly important truths which were formerly either not known, or entirely discredited, (it is lamentable that many should still be so slow to embrace them,) but which are now received by the more intelligent among the cultivators of the soil, as *agricultural axioms*, about which all doubt and discussion may cease; *axioms* that may be expressed in few words, and on the correctness of which any one, who chooses, may immediately and safely proceed to act. A few of these are—

That deep ploughing never need be dreaded.

A small farm well conducted is a source of greater revenue, than a large one indifferently managed.

It would be a vast amount of saving to the whole community, if every private owner were required to keep his stock from committing depredations on his neighbors, instead of imposing this onerous burden upon them.

The profits of agriculture (other things being equal) are in proportion to the attention paid to manuring; that is, as is the extent of the latter, so will be that of the former.

The corn crop, with the stalk cut up from the ground entire, at a much earlier period than has usually been practised, is worth almost double what it is when gathered in the old way.

Prepared food of some kinds, and for some animals, will go nearly, if not quite, twice as far as that which is given in a raw and natural state.

The raising of tobacco need not empoverish the land, but it is only to the undue and disproportionate space that is allotted to this staple commodity that the mischief it is said to have produced, is attributable.

Other points of a similar nature, and of like importance, might be mentioned, but these may suffice as specimens. If I had time, I should regard it as a pleasing amusement to collect from your own, and other agricultural papers, a sheet or two of such short sententious sayings, which, when put together, I would style "The Farmer's practical Compend and Guide," which would serve as a manual to spread out before him, within a narrow compass, the results of agricultural experience and wisdom.

I have also been much gratified with the resolution you have manifested to grapple with prejudices of extensive prevalence and long standing, which oppose their obstructing force to the improvements you would introduce, and which seem, with some, to abide with a fixedness almost as firm as "the Ridge of Blue" on our west. But time must melt even *these*, if not *that* away. May yours be the honor and the achievement first to start them into motion that will be kept up till they shall be driven to "a returnless distance" from the "Old Dominion." To whatever other cause the low state of agriculture that is complained of in Virginia may be referred, it is certain to my mind, that it cannot, with the least shadow of propriety, be attributed to a deficiency in natural advantages. In these respects, as in the extent of her territory, she surpasses her proud sister, the State of New York. Her soil is as good, if not better—her water and land privileges for internal improvements, *on the whole* about equal—her timber more valuable—her mines, as far as yet explored, more numerous and rich, and her climate, beyond all question, vastly superior. But still it must be admitted that she now falls behind in almost every thing that constitutes the wealth and strength of a commonwealth. An adequate cause for an effect so obvious, and so extensively experienced, must somewhere exist, and may be

assigned. Without attempting to account for it altogether from the fact that slavery here exists, which, perhaps, would be taking a position that many would be disposed to controvert, it appears to me, that some other things may be mentioned, which are evils that more easily admit of correction, that are extremely injurious in their operation, and the removal of which should forthwith enlist the exertions of all who have influence, and who love "the land of their birth." Owing to existing institutions, and to the influence of immemorial custom in Virginia, it has happened, that nearly every thing relating to the cultivation of the soil, as mode, implements, &c. has been committed to the hands of slaves, or to white men whose ingenuity and knowledge, (might it not without impropriety be said, whose ignorance and unskilfulness, *as a class?*) gave to them qualifications for their employment scarcely superior to those of the untutored negroes. The consequence is, that the *intellect* of this country has never been brought to bear on the interesting subject of agriculture. It has been diverted into other channels. Virginia has had her orators, and her professional men of eminence, but few of them have thought it worth their while to employ their intellectual energies on "the first and finest" earthly occupation of man; an occupation which opens a range most delightful, and of sufficient dimensions, to call into exercise the resources of the most expanded mind. If you, sir, can have success with your fellow citizens in directing *mind* and *thought* to the subject of agriculture in this State, it will flourish, and you will do much, perhaps more than any other man for its ultimate prosperity and happiness. Would it not be advisable, (you will excuse me for the liberty I take in making the suggestion,) to endeavor by application to the legislature, or to private individuals of enterprise and public spirit, to put into operation a plan for the purpose of training suitable persons to the pursuits of agriculture, who should acquire themselves the information necessary for constructing agricultural implements, and using them dexterously, and who should be able to teach others the same? The disadvantages under which laborers perform their tasks, arising from bad implements, and, as appears to me, still more from their unskilful use of them, are incalculably great. It is difficult to do that adroitly which we have never *seen* done in this manner. To tell *how* it should be done is not enough. There must be the *practical* exhibition, or the lesson designed to be conveyed will not be learnt. Negroes, as all acquainted with them know, are exceedingly dull of apprehension at best. There seems to be an inversion of intellectual vision peculiar to the race, which presents right to their view as wrong, and wrong as right; and this characteristic trait seems as natural to them as it does to some persons to use their left hand instead of the other. I have seen the experiment tried, in a great number of instances, of using the rake to gather into a bundle for binding, the wheat that had been thrown in a row from the cradle, and I do not recollect to have ever seen a single negro who, when left to himself, did not begin and go on with the operation, with his feet treading against the heads, instead of the lower ends of the straw. The same awkwardness is seen in a thousand other things. Would it not be good policy in their owners to have them competently instructed in these matters? White men do not know how to labor themselves, or what amount of work a laborer ought to accomplish in a given time. To this cause, I am inclined to think, is owing a great deal of the laziness, and deceptive artifices so common to the negro race; hence the little that they accomplish in comparison with a dexterous European, or New England laborer, as those acquainted with the performances of each are well aware. Slave labor, if unproductive and unprofitable, is chiefly so, in my apprehension, because it is injudiciously directed, and unwisely managed. Much, therefore, I conceive, might be gained to the interests of agriculture in this country, were a suitable attention to be paid to implements, and to the qualifications and management of laborers. But I am happy to find that these topics have not escaped your notice, and hope that your useful publication will hereafter pursue them to still greater lengths.

Can you not say something that will be likely to have an influence in leading greater numbers of our white population to *labor, working with their own hands?* and thus do away the most unreasonable, the most pernicious, and, as I consider it, the most unchristian of all reproaches, *the reproach of labor.* Agriculture will flourish in Virginia when *white men* put their hands to it, and not very extensively, I apprehend, until this event is brought about.

BENJAMIN F. STANTON.

Prince Edward, October 9, 1834.

POUNDED BONES—THREE AND FOUR-SHIFT ROTATIONS.

To the Editor of the Farmers' Register.

Richmond 7th Oct. 1834.

In your last number, as well as in some former ones, you recommend the use of bone manure. From various accounts of it that I have seen in English works, I have been long satisfied of its great value; and as bones might be collected in large quantities in and about this place, I have very often thought of having them collected, and ground for manure, but have in vain sought for information as to the best method of reducing them to powder. On this subject all the English works I have seen, as well as your Register, are silent. If you could ascertain the best mode of performing this operation, your making it known would be a public benefit. Animal bones are generally so hard that I apprehend they would not be sufficiently ground without water-power, or at a greater expense than the object would justify. Perhaps they might be broken into fragments small enough for grinding by one of the common horse mills for breaking bark, an old mill stone drawn round a vertical axis; but I think it would cost too much labor to reduce them in this way to a powder sufficiently fine. I have thought of passing the fragments of large bones, and the smaller ones, between iron rollers, fluted or plain—the common plaster mill made stronger than usual, a tan bark mill, &c. but am by no means sure that either would answer: and as there are many bone mills in England, and some no doubt in this country, (I think I have heard of one or more in Baltimore) it is very desirable that it should be known among us what kind of machine has been found best in practice. It would be very desirable to have pub-

lic mills for the purpose; but if the machinery is not too costly, many proprietors who have water-power might have bone mills on their own plantations, connected with the water wheel of a saw, or grist mill.

Will you permit me, while I express my satisfaction with the general plan and execution of your work, to suggest that you might render it still more valuable by giving your subscribers more frequently your own views of the different improvements in husbandry, &c. recommended by your correspondents. Your modesty may suggest that this might be assuming too much for yourself, but the same objection would lie to every communication you publish which recommends any new practice, or finds fault with old ones. I am persuaded you would most generally be right, and if wrong, your remarks would naturally lead to discussions which might lead eventually to right conclusions.

I have been led to these remarks by the strong and uncontradicted approval by your correspondents of the four-course system of cropping, in wheat, corn, wheat, clover—three grain crops in four years, and the heavy censure that is cast on the *barbarous course* of two grain crops, corn and wheat, in three years, as if two grain crops in three years exhausted the land, and three in four years improved it. It is true that the latter rotation includes clover, and no one can think more highly of that invaluable plant than myself, but unfortunately, a very large proportion of us are obliged to cultivate lands naturally too poor, or too light for clover, and have not the means of fertilising them on a large scale, by animal manures or marl; but thinking, as I do, that we can have no good husbandry without clover, I am yet to learn that it would succeed better after three crops of grain than after two. The four-shift system of the active and judicious proprietors of the rich mellow soils of Shirley and Westover, may answer as to them, with the aid of animal manures, lime or marl, and standing pastures, but I think would hardly succeed without these helps, on the comparatively poor lands which most of us are obliged to cultivate. It ought never to be forgotten, that while good husbandry will succeed under a bad system, no system however good, will atone for the defects of bad cultivation.

You will not understand me as censuring the plan of farming adopted by the gentlemen I have referred to. On the contrary, I am persuaded that it will turn out very well with their good management, with lime or marl, plentiful manuring, and standing pastures sufficient for their stock; but I cannot at present believe it would answer on poorer lands without these advantages. Different rotations of crops are good or bad, not in the abstract, but with reference to soil, situation, &c. A well considered estimate of the advantages and disadvantages of this mode of cropping on lands that will bear it, and of its effects on soils less fertile, or that cannot have the benefit of lime or marl, or a large supply of other manures, would be very desirable, and I trust will ere long be found in your work.

JOHN WICKHAM.

[The information requested in regard to the pounding or pulverizing bones for manure, will be sought, and furnished as soon as obtained.

The suggestion that the more frequent exhibition of our own views and observations, on many of the various subjects presented in the Farmers' Register, could not come from a source entitled to more respect, nor to which we should be more ready to yield the objections which have formerly been stated to a general adoption of such a course.

We agree entirely with our correspondent in his remarks on the three-shift rotation; and have often wondered at the very general agreement in denouncing it as empoverishing and destructive, and of lauding the four-shift rotation as profitable, and enriching to the soil, without its being kept in view how much each of these rotations may be varied, and how widely they *do* vary in practice on different farms. The old three-shift rotation, of two successive grain crops and the third year of close grazing, is certainly destructive and abominable—but it would have been made still more exhausting, and worse in every respect, if, by the addition of another grain crop, it had been changed to the four-shift rotation, without any other alteration. The three-shift rotation of corn, wheat, and clover left to be ploughed in for manure for the next crop, would certainly make less heavy draughts on the productiveness of the soil, than the four-shift (including three grain crops,) with no greater supply of putrescent manures. There may be improving or exhausting cultivation with either of these rotations: and in this respect, neither can be said, as a general rule, to have any superiority over the other. It depends on various other considerations—such as the nature of the soil, and its greater fitness for wheat, or for corn, the facilities for furnishing vegetable manures, and their permanency when applied, &c. &c., whether either of these, on some other rotation should be adopted. The four-shift rotation seems to be most advantageous for a farm of soil fit for both corn and wheat, because by omitting or adding a grain crop, the rotation may serve when the improvement of the poorest land is just commenced, and also when the farm has been made highly productive, without altering the number of shifts, or the boundaries of the fields. Either one, or two, or three grain crops may be taken in a rotation of four years, according to the condition of the field: and the first would be enough perhaps to take from land as poor as are most of the long worn fields of Lower Virginia—and the last would be as profitable as would be required, and as scourging as could be borne, when calcareous and putrescent manures and clover had brought the same to the highest state of productiveness. The same rotation of crops will never suit both poor and rich land—and it is far more convenient to increase the number of grain crops in each rotation, as required by the increased fertility of the soil, than to alter the number of years given to the rotation.]

CULTURE OF THE VINE IN ROCKBRIDGE.

To the Editor of the Farmers' Register.

Lexington, Va., September 26th, 1834.

It may not be uninteresting to some of your readers to know that a pretty fair experiment has been made in this neighborhood in the culture of the vine. Eight years ago last spring, one gentleman in this neighborhood and myself in con-

nexion with another gentleman, obtained from Major Adlum, near Georgetown, and from one or two of the northern nurseries, a supply of grape cuttings of different kinds, and planted them. We selected a very elevated hill-side, a few miles from our village, (on the farm of the gentleman concerned with me) having a south east exposure, entirely protected from the north and west winds, of loose, gravelly soil, and not remarkable either for its fertility or poverty. On this spot we planted our vines, placing them in rows about twelve feet apart, and from six to ten in the rows. They generally grew pretty well—that is to say, a large proportion of the vines lived. They commenced to bear a little, I think, the third year after they were set out, and have been gradually increasing in size and productiveness up to the present time. This year, had not the spring been so unfavorable, we think we should have had quite a *smart* crop: as it was, the quantity was very much diminished, and a large number of the grapes did not come to perfection. We have ascertained from our experiment that of all the different kinds of grapes we have tried, there are but few worth cultivating in this climate. Two are particularly worthy of notice, both of which we obtained from Major Adlum—they are called the "Isabella," and "Catawba." The vines grow most luxuriantly, having evidently found a congenial soil, whilst nearly all the rest, although they live and even grow slowly, look stinted and seem to be dragging out a miserable existence. The Catawba and Isabella produce fine large clusters, many of them weighing over a pound. The first, while ripening, is of a beautiful pink, and when fully ripe of a very deep copper color. The latter when ripe of a very dark purple nearly approaching to black. They are both very fine table grapes, particularly the Catawba. I think it decidedly not only the finest grape but the finest fruit, I have ever eaten. They can be kept as well as the apple by simply packing them in layers with very dry saw-dust. We had good fresh grapes on the first of May of the preceding year. The Fox grape we have tried. The vines grow most luxuriantly, but they have borne only a few scattering grapes. We talk of cutting them down this fall as cumberers of the ground. We have one Scuppernong vine growing in our vineyard, the cutting for which we obtained from a friend in Richmond. This vine seems to grow tolerably well, but as yet (this being the fourth year) has borne no fruit. A few little grapes were found on it this year, but did not come to perfection. It is a perfect anomaly among vines; in its extreme appearance it resembles no other vine but looks much more like a hazle bush. It is said that in some of its other properties it differs from any other vine, such as not requiring to be pruned, &c., but of this last we know nothing of our own knowledge.

We are now making some experiments with some carefully selected *native* grapes, but have not had sufficient time as yet to say what will be the result. The grapes we think are improving both in size and flavor as the vines grow older.

In another communication, if you desire it, I may give you our experience in wine making, &c. &c.

JOHN F. CARUTHERS.

CUNNINGHAM AND NORTON GRAPES.

To the Editor of the Farmers' Register.

Richmond, September 20th, 1834.

I have sent you a small box by this evening's steam boat, containing two varieties of grape, Cunningham's Prince Edward, a native of the county of Prince Edward, and Norton's Virginia seedling. The American Farmer had something to say about the seedling the last year; you may recollect it—you are now to judge for yourself. Both varieties are abundant and never failing in their crops. Any portion of the state will yield them to a certainty, and if the culture of these fruits is attended to, the United States in a few years will cease to import wine.

D. N. NORTON.

[The grapes referred to above were received after five days had passed of the rainy weather in the latter part of September. Owing to this delay probably, many of the Norton grapes had rotted, or showed the commencement of decay, though the greater part were still sound. The Cunningham grapes were in better preservation, and were remarkable for the firmness of the bunches. Our family jury of tasters were about equally divided as to which possessed the better flavor; but all agreed that both kinds were excellent. The sweet of the Norton was the more unmixed and luscious—that of the Cunningham was flavored with enough of acid to make it (according to our individual opinion) still more agreeable to the taste. In both, the saccharine principle appeared to be abundant. The unfavorable opinion respecting the Norton grape expressed in the American Farmer, and referred to in Dr. Norton's letter, may be seen at page 301, vol. I. of the Farmers' Register.

We have inserted above, and previously, several different articles which present a favorable prospect of the culture of the vine in this country—and shall be better pleased to be enabled to offer more full and more satisfactory accounts from the same, or from other correspondents. We feel much interest in the success of this culture, not only as a new and profitable branch of agricultural enterprise and industry, but because we fully believe that the extensive production of pure and unadulterated wine in any country is one of the surest safeguards against drunkenness being a national, or prevailing vice. But although the hope of the extended and general culture has often been held out by different persons, the best proof has not yet been furnished by the successful and profitable general results of the labors of any one individual. Why this has not been done, or if done, why the public are not informed of it, we are not able to say. We request of the many cultivators of the vine among our readers to communicate their views as to the causes of the small degree of success, and the variable and very uncertain results, heretofore obtained—and whether there is any obstacle to prevent grapes being produced plentifully, and wine made profitably, as a regular branch of husbandry, in the Southern States. There is no doubt as to our being able to raise delicious grapes, and sometimes abundant crops of them—and also that from them excellent

wine has been often made. The question is, can these results be obtained with enough certainty, by attention to proper rules, to make the pursuit at least as profitable as the cultivation of corn, or wheat, cotton or tobacco?

We propose soon to republish Mr. Herbemont's method of making wine. This was intended to have been done just before the commencement of the present wine making season, but was prevented by unavoidable circumstances. In the meantime, for the purpose of making the publication of more value to our readers, we particularly recommend to its author the consideration of the foregoing inquiry—which he is peculiarly fitted to throw light on, not only from his own attention to the subject, and his devotion to the pursuit in this country, but also from his personal knowledge of the vine culture of France.]

VETCHES, &c. PLOUGHED IN.

Under this article may be included all sorts of green manure. Amongst the most active parts employed as manure, I have found the wild species of the genus Sinapis, ploughed in fresh in the bottom of turnip drills, at the rate of twenty tons per acre. The produce brought by auction £12, while the rest of the field manured with twenty tons of farm-yard dung, brought only from £9 to £10 per acre. Other weeds, such as nettles, thistles, ragwort, &c. produce crops superior to farm-yard dung. Potato stems, fresh ploughed in on clover lay for wheat, I have found to produce crops exceeding by two bolls per acre, in quantity, with more proportionate weight of straw, the other parts of the same field manured with farm-yard dung, but otherwise under the same circumstances. The stems from three acres of good potatoes, will manure an acre for wheat to much better purpose than 15 tons of farm-yard dung, the usual quantity allowed in that part of the rotation; clover after wheat being the crop which generally precedes fallow. Under the head of "green manure," I may mention an experiment I this year made with pea straw converted into dung without the aid of cattle. Having something of that sort on hand about the middle of last May, and being in want of some loads of manure to finish a potato field, I had the peas thrashed at the mill, and the straw and chaff carried to the side of the potato field, and made up like a large hot-bed, giving each layer of straw an ample watering. Fermentation soon commenced: and by the fifth day the mass was so far decomposed as to be easily filled into the carts. The effluvium in filling was almost intolerable. It was in this state laid in the bottom of the drills; the sets of potatoes were planted above, and the earth ploughed over the whole. Notwithstanding the dry nature of the ground, and the dry state of the weather in the summer months, the part of the field manured with decomposed pea-straw yielded a better return than where farm-yard dung was applied.—*Loudon.*

For the Farmers' Register.

IMPROVEMENT OF WORN LAND.

This is an age of improvement. The arts are advancing, facilities of intercourse greatly increasing, with accelerated march to their higher destinies. Shall the agriculturist, the bone and sinew of the country, remain indifferent amidst the general improvement, and make no effort to restore the Old Dominion? I am persuaded they will not. Agricultural societies are forming in many parts of the country, and if fostered, will exert the happiest influence, by disseminating among the people every new and important discovery in agriculture. The field is wide, and the societies might elicit the energy of practical men by premiums for the best essays on agricultural subjects written for *gratuitous circulation.* A system of improvement better adapted to the age in which we live might be introduced in this way, as it is a matter of general concern.

If any system can be devised by which the worn lands can be restored, emigration to the west would cease. The idea exists that nothing can be done for the old lands of Virginia, (an entire mistake.) I live in the tobacco district of country, and as it is the most exhausted part of the country, I will give my views, and hope that others more experienced, will follow the example. The improvement of land exhausted by the culture of tobacco is a subject of deep interest. Every planter is interested, and should contribute to the spirit of improvement by some hint, some experiment or observation.

The improvement of the worn lands in this region of country, the waste of many years, will require more patience and perseverance than can be brought to bear successfully at present; for as long as we have land to clear, or much land in good heart, there will not be much improvement, as *nothing*, it seems, but dire necessity can influence us to make the effort. This we learn from the fact, that all owners of exhausted land are often brought to the dilemma of deserting the country, or improving their estates—and here I would remark (with shame be it said) that few, very few, are in enviable circumstances—comparatively few in possession of lands in a state of improvement.

Our lands are deteriorating, and we are virtually driven, by the force of circumstances, to abandon the old plan of manuring one or two lots only for tobacco near our dwellings, and to commence some system of improvement for every species of *crop.* The returns from our fields of grain are diminishing yearly—every man of candor will admit this fact. As to the modes of improvement, fortunately, we have means *plenteous* and *various;* there is, we all know, nothing wanting but the *will*, and the *industry.* Suppose one month in the fall of the year was devoted to the collection of litter, the leaves that fall in our forests, whether of oak or pine, would afford an inexhaustible *supply.* They should be carried into the farm pens and stable yards, before they have been dryed with the winter winds, together with corn stalks, wheat straw—shrubs and brush, thrown on the galled land; and if all land should be covered with leaves directly from the woods, I have seen the happiest effect on stiff land, and once knew a planter who said he desired no better manure—he was very successful. He made it a business to cover his tobacco lots every year.

The present aspect of the country exhibits a wilful waste. There is yet a great deal of down-hill ploughing. This subject deserves the immediate attention of every cultivator, for no improve-

ment can be made in the face of the country, without hill-side ditches, or trenches, to which the cultivators of the soil have been timely aroused by the pen of Mr. Bruce. The precipitate discharge of the rain-water may be prevented by these graduated channels, and a system of improvement now commence under their protection.

I have commenced the improvement of land heretofore cultivated in corn and small grain, relying on clover and herds grass to keep up my tobacco land. I am satisfied from frequent experiments, that tobacco does better after herds grass than any other I have tried; certainly better than after clover, for I have observed that tobacco is generally faded and sickly after clover, unless plastered. Herds grass has a most happy effect on all lands I have tried, both stiff and sandy; and I think, I may say, it restores the land nearer to its virgin state, than any other improver. After three or four years in grass, the land may be cultivated as many in tobacco without manure. Sow it down afterwards in wheat and grass. The improvement from herds grass is derived almost entirely from the roots giving a strong turf. The top I have never considered important to fall on the land, as it becomes very dry after ripening. Land in grass improves if mowed every year, with the addition of yielding rent in the way of hay. As I before observed, I have commenced the improvement of my grain land, and shall go on *pari passu* until I can say, there has been a visitation, not in an evil sense, to every nook and corner; when every acre of land shall have received some aid to resuscitate it, and without which, our lands cannot be restored.

Surface manuring I am persuaded is the most expeditious mode of improvement. Of its effects I have no doubt. Look at the yards of old settlements, made rich, inexhaustibly so, from surface manure. The places where grain, hay, &c. are stacked, seem never to lose the influence. Farm-pens and cow-pens are enriched by the juices that operate more immediately on the surface. It is my practice to change my stacking places and farm-pens every year, and by that process have improved much exhausted land, always selecting the poorest places.

I have observed also a marked difference in the crop when the manure is suffered to remain a short time in piles: the impression or stain gives life to the land that is not imparted by manure ploughed under.

I am inclined to the opinon, that we should manure our lands one year in advance of the crop to be cultivated, the manure to be applied as a top dressing. It would certainly give a most luxuriant crop of *weeds and grass*, after which, all crops do well. The objection to manuring, the same year of cultivation, is that in very dry seasons the manure, although ploughed under, does not incorporate, and the benefit is lost to the growing crop.

In the spring of 1832, I carted out some stable manure, and put it in heaps on exhausted clay land, from which places the manure in a few days were removed, leaving nothing but the impression or stain. In the spring of 1834, I observed that every place where the piles lay, a fine turf of herds grass might be seen, and the adjacent places where the manure was not put, remained destitute of any verdure—there was no design of experiment—the manure was thrown there for the purpose of manuring an enclosed piece of land, to which the cart could not conveniently go. If top-dressing should be resorted to, and we would supply our stables with herds grass hay, a sufficiency of seed would be mixed with the manure to improve any land. If the fields, the barren fields, that offend the eye of the traveller and tells the poverty of the owners, were sprinkled, after a deep fallow, with herds grass manure, I have no doubt the scene would be changed, as indicated by the places from which the piles of manure were removed.

I hope these remarks may be received with that allowance due to one unaccustomed to writing for the public eye. If any hint or suggestion here should be regarded as useful, in the way of improving the worn lands, I shall be amply remunerated for this communication.

M.

For the Farmers' Register.

CONSTITUTION OF THE BUCKINGHAM AGRICULTURAL SOCIETY.

Article 1. This society shall be known and called by the name of "*The Buckingham Agricultural Society.*"

Article 2.—Section 1. There shall be an annual meeting of this society, on the third Thursday in October, at such a place as may be fixed upon by adjournment.

Section 2. One-fifth of the members of the society shall constitute a quorum at the annual meetings.

Section 3. If from any cause a quorum should not attend the annual meeting, the next day shall be the day of meeting, and should a quorum still fail to meet, the officers elect shall continue in office until the next annual meeting.

Article 3.—Section 1. There shall be a president, three vice presidents, a corresponding and a recording secretary, a treasurer, and a board of directors, to consist of the officers, and six other members all to be chosen annually. All elections shall be *viva voce*; and a majority of the members present shall be necessary for a choice.

Section 2. It shall be the duty of the president, to preside at all meetings of the society and board of directors. In the absence of the president, one of the vice presidents shall preside.

Section 3. The president and vice presidents shall be ineligible for one year, next after their time of service shall have expired.

Section 4. It shall be the duty of the recording secretary to make and keep a fair record of the proceedings of the society and board of directors.

Section 5. It shall be the duty of the corresponding secretary to conduct all correspondence for the society and board of directors.

Section 6. It shall be the duty of the treasurer to receive all dues to the society, and pay all demands as ordered by the society and board of directors, and render and settle his accounts at each annual meeting.

Section 7. It shall also be the duty of the treasurer, at each annual meeting, to make report of all members that have failed to pay their annual contributions or other dues to the society, and if any member or members shall be reported thus delinquent, for two annual meetings successively, such member or members shall no longer be regarded as belonging to the society, and shall not thereafter

be so considered, without first making payment of such arrearages.

Section 8. It shall be the duty of the board of directors, to specify to what objects premiums shall be awarded, and what amount: and transact all other business necessary for the well being of the society.

Section 9. There shall be committees of three appointed to award premiums to the various objects designated.

Article 4.—Section 1. The payment of two dollars by a citizen of this county, or any one owning and cultivating a farm therein, and such annual contributions as may be required by the society, shall constitute membership.

Section 2. Any member may withdraw whenever he thinks proper, by notifying the recording secretary, after having paid his dues.

Section 3. Each member of this society, at their annual meetings, shall furnish an essay upon some subject connected with the objects of the society.

Article 5. Before an adjournment, the proceedings of the society and board of directors shall be read, and signed by the president and recording secretary.

Article 6. Two-thirds of the members present, at any annual meeting, may alter or amend this constitution.

Signed,

THOMAS M. BONDURANT, *President.*

Granderson Moseley, Rec. Sec.*

From the Rail Road Journal.

RAIL ROAD IN VIRGINIA.

Orange C. H., Va. October 1834.

Dear Sir,—I have noticed in the Virginia Herald a project for a rail road from Fredericksburg, or the Great Bend of the Potomac, to the Virginia Springs, through the Blue Ridge, &c. I look upon this scheme as both practicable and grand, as far as it goes. But one has only to open his eyes upon your new Rail Road Map, which should be in the hands of every friend to internal improvement, in order to be convinced that if this rail road is continued on from the Virginia Springs to the ever navigable waters on the Great Bend of the Ohio at Guyandot, it at once opens the most superb highway that can possibly be constructed in the United States, to the great West. It unites the great South west with the Atlantic in a much shorter distance than the great Erie canal; and when completed, will enable the farmers of the west to carry their corn, which now sells for 12½ cents a bushel, to the city of New York in less than 48 hours. Besides, the public will be accommodated in carrying from the great Valley of the Mississippi, and thence through Fredericksburg and Washington, Baltimore and Philadelphia, to your city, in a comparatively short period; whereas, to my knowledge, hundreds, if not thousands have, during the past season, waited at Guyandot, day after day, for want of conveyance to the White Sulphur and the northern cities. All the travel from the South west to Washington city, during the session of congress, will of course fall into this track, the route being nearer and quicker than any other. The inhabitants of Kanawha are now ready to do much for the construction of this road, in order to give free transport to the millions of bushels of salt now manufactured annually at their works. A few days ago I saw a merchant from near the salt works on his way to Philadelphia and New York to buy goods, which he said he should send home by way of Pittsburg or Wheeling, and that he must wait for rains, because the Ohio was quite too low at this time, and at the best it required four weeks at least. Were the rail road of which we have been speaking completed, it would require no more than 44 or 45 hours to transport the same goods from New York. If I had time I might mention other advantages, but I only wish to call the attention of the public to this route, and I am sure that they will at once see those advantages, and save me the trouble of mentioning them. I am glad to learn that wood for rail roads can now be made durable, as it will greatly lessen the expense of excavations and embankments. In the route above mentioned, there are but few streams to cross, and the gaps through the mountains render it comparatively a level grade. I remain, dear sir, very respectfully, yours,

J. MACADAM, JR.

From the Free Press.

GREAT SALE OF IMPROVED STOCK IN JEFFERSON COUNTY, VA.

At the sale, last week, of the improved stock upon the farm of the late Henry S. Turner, Esq. the following extraordinary sales were made:

One	Durham Cow, 8 years old, for		$255
One	do.	Bull, 2 years old,	325
One	do.	Heifer, 1 year old,	231
One	do.	Bull Calf, 4 mo. old,	162
One	do.	Milch Cow,	130
One	do.	do. do.	155
One	do.	do. do.	120
			$1378

From the British Farmer's Magazine of July 1834.

ECONOMICAL MODE OF PREPARING FOOD FOR CART HORSES.

In a former number of this work a correspondent proposed an inquiry as to the most economical mode of keeping cart-horses in town. We were in hopes some of our readers, acquainted with the subject, might be induced to furnish us with the means of gratifying him, but being disappointed in this expectation, we ourselves instituted an inquiry, and have, at length, been enabled to make an authentic statement of the best practice, and the most economical, which has ever come under our notice.

Our attention was not improperly directed, in the first instance, to the condition of the various fine teams of cart-horses, which all visitors to the town of Liverpool must have seen and admired, because we presumed that our correspondent did not seek information how some miserable animal might be enabled barely to exist under severe

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* In the proceedings of the Buckingham Agricultural Society, in No. 5, the name of Granderson Moseley was incorrectly inserted as George Moseley.

work, but how high condition might be maintained, under such circumstances, at the least expense. In the course of investigation we were much struck with the beautiful condition of the Earl of Balcarres's horses ten of which are kept in Liverpool for the purpose of delivering the coal brought thither from his lordship's mines, and by the kindness of Mr. Cannell, his lordship's agent, though not, it is true, without some demur on his part, as to what appeared so inquisitorial an investigation, we are enabled to make a statement which may be implicitly relied on.

Lord Balcarres's horses, like most of those used for draught in this town, are particularly large, and in a district quite celebrated, and justly so, for this description of horse, we certainly have seen nothing equal, take them altogether, to his lordship's teams. So superior are they, indeed, that we venture to recommend any agricultural visitor to Liverpool to make a point of seeing them. They are principally horses bred in Lancashire, and of the black breed which has long been the boast of the farmers in the neighborhood of Liverpool.

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It may not be improper to preface the account of the manner in which Earl Balcarres's horses are kept by observing that they make long days, and the average load of two horses is three tons, including the cart.

The following is a statement of the nature, quantity, and cost of the food consumed by ten horses during seven days. The outside current prices are charged for each article, and, of course, the reader will bear in mind that a different state of markets will vary the cost of maintenance.

Keep of ten horses seven days:

	£	s.	d.
33 bushels (90lbs per bushel) of potatoes, steamed, at 1s. 6d. per bushel, . .	2	9	6
2½ bushels (60lbs) of barley, crushed very fine, at 4s.	0	10	0
2½ ditto beans (60lbs) do. at 4s. 6d.	0	11	3
22 stones (20lbs) of cut hay to mix with potatoes, at 9d. per stone . . .	0	16	6
14 stones (20lbs) of hay uncut, at 9d. .	0	10	6
Fire and labor, ...	0	2	0
	£4	19	9

We repeat that the horses kept thus are in the highest possible condition and health, and while we re-assert that the particulars of the statement may be relied on, it will be admitted that this plan, which has been adopted in Ireland, and also America, is well entitled to be called *economical.* To what has already been said, it may be proper to add, that a mode of horse-keeping, similar in nature, has long prevailed among the farmers of Lancashire, but they have not benefited to any thing like the extent which the adoption of the perfected system, previously mentioned, would allow of. There is, however, no reason why they should not do so, and it may be hoped this statement will reach the hands of some influential occupier, who will regard the matter in its proper light, and by his example promote what our recommendation might otherwise in vain attempt.

FOUR-FIELD ROTATION—TURKEY WHEAT.

To the Editor of the Farmers' Register.

Westover, October 11th, 1834.

My wheat crop of this year has not met my expectations fully, though a pretty good one; averaging 17½ to the acre. I thought after it was harvested it would yield 20 bushels per acre. The fallow field, although much the thinnest land produced 2200 bushels, and the corn land 1300. The crop in Curle's Neck brought an average of 13 bushels on a surface of 800 acres. These crops plead much for the four-field and fallow-system, although far from being full ones. I expect in a few more years (particularly if enabled to marl) to average from 20 to 25 bushels per acre with almost a certainty, as my farm is rapidly improving from the wonderful effects of clover and plaster.

I have introduced into this neighborhod a most valuable wheat, and of which you must get some the next season for trial. It is called the turkey wheat: from what cause it takes this name I know not. It is rather a large grain, white, ripens about the same time that the purple straw does; remarkable strong straw; and consequently less liable to tumble; and if rusted, the grain seems not to be shrivelled, and I think yields as much or more than any wheat I have ever tried. It is much approved of by Mr. Chevallie who has reserved it for making family flour.

I look for each number of your valuable journal with increased interest, and cheering thoughts; as it always brings something new and interesting, to enlighten a poor farmer, and if I were an emperor *(as Jeremiah says)* I would compel every cultivator of the soil, who could spare $5 to take it.

JOHN A. SELDEN.

ON DECOMPOSED SALT AS A MANURE.

[The following extract is from a review of the treatise which we have noticed in a former number of the Farmers' Register. Though the method by which salt is decomposed for manure, is still kept secret by its discoverer, it appears more worthy of notice, from the statements of the following article. If the author of the treatise is as worthy of credit as may be presumed from the respect with which his discovery is spoken of by the reviewer, we must consider the subject of much importance to agriculture. There can be no question of the value of soda, the alkaline base of common salt, as a manure, if it could be obtained cheaply enough; and the decomposition of salt is affirmed to be so effected, as not to add much to the expense of the material.]

An Address to the Landed Interest on the important discovery of the Decomposition of Salt for the purposes of Manure.

By Henry Kemp. Ridgway & Son. London, 1834.

From the [British] Quarterly Journal of Agriculture.

Salt, in its common state, is doubtless a worthless and even dangerous manure. The few experiments which we made with it in that capacity soon confirmed its worthlessness in our estimation; and we have heard the late Mr. Rennie of Phantassie, who, it must be acknowledged, was an eminent agriculturist, mention that, in every attempt he made of it as a manure, the less he med-

dled with it the better for the crop. Now, the first trial of bone-dust or rape-cake would leave no such impression upon the mind. Salt being generally neglected as a manure is a proof of its inutility; for a good manure, so plentiful as salt is, would have insinuated itself, partially at least, into practice in spite of obstructions; though, we grant, the inconvenience of procuring it through the vexatious forms of the excise, may have operated against its universal dissemination. But there never existed any serious obstruction to the use of salt in agriculture. The high duty was only exacted when it was to be used for culinary purposes, and never for the purposes of agriculture. Besides, the duty has ceased for ten years, and yet how trifling is its use in agriculture, only 5000 tons a year, according to Mr. Johnson's own showing, all of which, or the greater part, may be consumed by culinary preparation, in the improved mode of feeding horses in coaching establishments. We quite agree with Mr. Kemp, when he contends "that no substance like salt, which is used only in quantities that would incur an expense of 10s. or 15s. an acre, could, at the present time, (nine or ten years subsequent to the great alteration in its price,) be considered of doubtful value, if it really possessed that decided excellence, which those who have endeavored to promote an extended use of it would have us believe."

Is common salt, therefore, useless in agriculture? By no means. It may be successfully used to destroy a host of vermin, such as snails, slugs, grubs, &c. which infest the soil and attack young plants. It is a delightful condiment in the food of live-stock. Experience has now established, that horses, for the saddle or harness, will do as much and as fast work on prepared food seasoned with salt, at much less expense, than in the ordinary mode of feeding them on dry hard food. This benefit would be still more perceptible in preparing the food in the same manner for the slow working horses of the farm. Were cattle permitted to have access to salt in the calf's crib, grazing field, and fattening stall, they would acquire an earlier maturity. See how regularly herds of buffalos and deer frequent the salt licks in America! But of all creatures sheep are delighted with salt. The graphic picture of the desire of sheep for salt, drawn by Arthur Young, and described by Mr. Kemp, is not in the least exaggerated. Many a time have we contemplated such a scene with a swelling bosom. Many a time have we envied the shepherd's life,—limb-tiring, watchful, and anxious as it is,—when we have seen the "fearful people" skipping and shaking their "woolly sides" in sport on a fresh break of turnips, or running with eager steps for the first lick of salt.

The great object which Mr. Kemp had in view in inditing his address to the owners and occupiers of land in Great Britain and Ireland, was not so much to argue against the use of common salt as a manure, as to show that, deleterious as it is to land in its common state, it yields a valuable and economical manure when decomposed. The history of this important discovery is thus given by Mr. Kemp:—

"Notwithstanding the constant disappointment with which all my trials of salt were attended, previously to its decomposition, I felt confident that it possessed a latent property, which would one day be found of infinite value to the farmer. I was not a little encouraged in the idea which I had thus formed of the capabilities of salt, from the circumstance, that being a substance of more universal diffusion than any other, either in its marine or fossil state, so, if it could be turned to account as a really useful manure, almost every portion of the cultivated surface of the earth would derive advantage from it. The small quantity which it seemed probable would be requisite for imparting fertility, would render it every where easily accessible. The great expense now incurred by the employment of bones, and many other artificial manures, would probably be superseded by a much cheaper and more efficient article in prepared salt. I did not think the expectation too sanguine that led me to calculate on the probability that such a discovery, in providing a simple and ready antidote to the exhaustion of soils, may become the means of ameliorating the condition of the human race to a degree almost incalculable. Only suppose that, by a new and improved system in agriculture, the earth was made to yield an increase in the ratio only of a tithe greater than it did before, how materially would such a result conduce to the welfare of mankind. Now, by the discovery which has furnished the subject of this address, I feel assured, that a produce even *one-third more* than is at present drawn from the soil, will readily be procured by its proper application to it.

"Salt is composed of soda and muriatic acid, at least so we usually describe it, though there are some other matters commonly associated with them, particularly in the marine kind, but the proportion is so inconsiderable, as to be hardly worth notice, and therefore, for the object before us, it is hardly necessary to consider it as consisting of any thing more than the ingredients we have named.

"The exact analysis of salt will be found as follows:—

1000 parts, by weight, of	Insoluble Matter.	Earthy Muriates.	Sulphate of Lime.	Sulphate of Magnesia.	Pure Salt.
Bay salt (St. Ubes,)	9	3	23½	4½	960
Scotch Marine,	4	28	15	17½	935½
Lymington ditto,	2	11	15	35	937
Cheshire crushed rock,	10	0¼	6⅓	.....	983¼
Cheshire salt,	1	1	14½	.....	983½

The proportions of soda and muriatic acid are about forty of the former to sixty of the latter in 100 parts.

"The decomposition of salt is very easily effected for its use in the arts, and for chemical experiment. *Muriatic acid* is extracted from salt by employing the sulphuric, which latter, having a greater affinity for its other constituent *soda*, enters into combination with it, while the former is set at liberty.

"The extrication of *soda* from salt has been accomplished by the agency of red oxide of lead, and for the process a Mr. Turner, many years ago, obtained a patent. There are, I believe, some other methods of dissolving the union between the component parts of salt, which are had recourse to, for their employment in some of our manufactures, but I never heard that any of them were considered capable of rendering the article available to agriculture. For this purpose they are far too expensive. As a general fertilizer of the earth, its wholesale application requires that its preparation should be accomplished in a very cheap and simple way. When millions of acres are to have their productions greatly increased by the aids of artificial manures, cheapness will, of course, be regarded as a leading requisite. This will be found a striking characteristic in the mode pursued in the present instance, for the expense of its preparation does not very materially enhance the first cost of it.

"Always fond of experimental farming," continues Mr. Kemp, "I have taken great pleasure in making comparative trials of the efficacy and value of different manures. The article of barilla having been employed with this view, and affording very decisive proof that it possessed the requisite properties in a high degree, it was inferred that its operation was consequent on the soda which this substance is known so largely to possess. Now, this circumstance first suggested the idea of the decomposition of salt, because, if the soda of barilla could act beneficially on vegetation, why should not the soda, so abundant in salt, be equally efficacious? It appeared probable, therefore, if the union between its constituent principles could be destroyed, or a perfect decomposition secured, and while the soda was thus at liberty, a new compound be formed with the chlorine, which should deprive it of its injurious qualities as a free acid, that salt, thus prepared, would yield facilities, from its cheapness, for increasing the productiveness of the earth beyond any thing hitherto known."

This decomposed salt has been applied as manure to every species of agricultural plant, and found to exercise extraordinary influence on every kind of soil. "It is scarcely necessary," says Mr. Kemp, "that I should enter into very minute details of the effects produced by prepared salt upon every description of crop. Nearly all the varieties of plants known as agricultural, have been submitted to its action, and, without any exception that I am aware of, have fully demonstrated its great stimulating powers. Corn, pulse roots, and grass, have all attested by their great luxuriance and increased produce, the force and energy of this manure. The multiplied varieties of the culinary and flower garden have also borne witness to the general efficacy of prepared salt; and though I am aware that the superior culture usually bestowed on these departments hinders them from offering so unequivocal a test as fields that are worn and exhausted by corn, yet the superior health and vigor of every thing to which it was applied in the gardens, afforded the strongest evidence for concluding that its agency may be as universal as dung, or any other great assistant of vegetation."

The efficacy of this decomposed salt has also been tried comparatively with bone-dust, dung, oil-cake, and whale-blubber, and its results are superior to any of them.

Mr. Kemp, we suspect, hardly does justice to bone-dust. It is no doubt more suited to a dry soil or a dry subsoil than a heavy; but the experience of this country from the Tweed to the Grampians, a space which embraces every variety of soil, has proved its value as a raiser of turnips beyond a doubt. Turnips are not raised on strong clays, and of course bones are never applied to them. As to sheep being affected with the rot by eating bone turnip, we cannot believe; because a bone turnip is always harder and more astringent than one raised with dung. We suspect "the worthy farmer" was trying the extent of Mr. Kemp's faith in this matter. Should such, however, be the fact, we should like to see it authenticated. The particular instance adduced by the farmer is no proof of the fact, for we have seen the nature of the subsoil affect the feeding quality of the turnip more than manures. In this country, sixteen bushels of bone-dust are quite sufficient for the imperial acre, which cost just two pounds; and if the bone-dust is mixed with ashes, half that quantity will serve.

Mr. Kemp recommends an excellent method of mixing the viscid whale-blubber with soft saw-dust, at 25 bushels per acre; but where is saw-dust to be obtained in such quantities? A friend of ours for a long period used a great quantity of blubber every year. His practice was to mix it with earth, by making a bed of earth like the plasterer's bed of sand and lime before the water is poured in. The blubber, thus mixed stood about a year and a half, and was then applied as top-dressing to old grass. The benefits were great, every plant of moss being extirpated by it. Green blubber will injure any growing crop by its causticity; and even a compost formed on grass will affect the ground so as not a particle of vegetation will grow upon it for years. We have heard of a similar effect being produced by brimstone. A vessel partly laden with brimstone from Messina to Leith, was stranded on the English coast near the Coquet Island. The brimstone, 50 or 60 tons, was taken out and piled in a heap on a piece of old grass. It lay there for three months till the vessel was repaired. For fifteen years not a plant would grow upon the spot occupied by it.

Mr. Kemp makes some very judicious remarks on planting, and proves the beneficial effects of manure on the growth of trees. Many an acre of ground has been planted in a state utterly unfit for the purpose. Nothing but a set of diseased ricketty sticks, offensive to the eye, grievous to the heart, and unprofitable to the pockets of the proprietor, could be expected from such management. Many a tree plant, which has cost much care in the nursery, has been cruelly starved to death in the moorland.

In the application of decomposed salt, Mr. Kemp says, one ton is sufficient for three acres. By the help of three horses, three men will sow of salt and seed eight or ten acres of turnips in a day with a drill-machine, but with a broadcast one,

more. The salt produces one-third more of corn than the best dung, and its cost is only about 10s. per imperial acre.

We thus see that decomposed salt is suited to every purpose of field and forest manure. But what is this decomposed salt of which so much has been said, and how is it to be obtained so cheaply? We shall give Mr. Kemp's own answer to these questions. "I think I have now said enough," says he, "on decomposed salt, to engage the attention of all who are interested in the subject of manures. The reader has probably expected long ago that I should develope the process whereby the new material is prepared. He has, I dare say, concluded that every succeeding page would afford him the desired information, and I admit that such an expectation was natural enough previously to his being apprised of my intentions. When my letter on the discovery was first published, a good deal of curiosity was produced by it among agriculturists, and many who wrote to me on the subject requested I would furnish them with the particulars necessary to reap advantage from it. I replied, that I was quite prepared to promulgate the plan, but that I conceived myself entitled to some remuneration; and added, I was sure they could not expect such exclusive disinterestedness on my part, as that I should forego my claim to compensation, while the advantages received by both farmer and proprietor would be of so much importance to them. I would beg now to repeat, that I am confident no reasonable person will feel inclined to charge me with being *un*-reasonable for hesitating to give the desired information gratuitously.

"The '*quid pro quo*' is so universally acted on, and is so completely the governing principle in all the transactions of life, that surely there is no room for a feeling of surprise that a *consideration* should be expected for what I am persuaded would be admitted to be of infinitely more value than any pecuniary acknowledgement. No candid or reflecting mind will be disposed to cast an imputation of selfishness, when all that is desired is merely simple justice."

We are sorry that Mr. Kemp has taken this determination. We do not impute selfishness or unreasonableness to him. Every sentence of his little book is the production of a candid and liberal mind. But how can he benefit himself by keeping the secret in his own bosom? There are only two ways by which he can *secure to himself* the benefit of his discovery, but neither of them will benefit the public. The one is by keeping his own secret, the disadvantage of which Mr. Kemp no doubt already feels; the other is by manufacturing the article himself in some central part of the kingdom, say London. But, as a commodity which is sold cheap cannot afford to pay a high carriage, the public in the distant parts of the kingdom will derive no benefit from his valuable discovery. As to a patent, it would be universally infringed, for the process of making the salt must be simple, otherwise it could not be sold cheap, and to prevent the infringement by prosecutions would be as impracticable as to convict a large mob in a city of a misdemeanor. Mr. Kemp cannot expect a reward from the landed interest, for they will not subscribe for a new article whose specific efficacy they have never witnessed. How, then, can he obtain a remuneration for his discovery, which it is reasonable he should receive, and the agriculturists at the same time enjoy the benefit of it? Our advice to Mr. Kemp is what we ourselves would do under similar circumstances.

We would at once divulge the secret widely, the more widely the better, and take the chance of remuneration. There is no other way of securing the benefits equally to himself and the agriculturists, and through them to the nation. Parliament cannot truly be charged with illiberality in grants to private individuals, whose discoveries have benefited the nation. A reward was given to a person who invented the making of biscuits for the navy with machinery. Mr. Macadam also received a Parliamentary reward for introducing the improved mode of making roads. A Parliamentary grant has been conferred on the gallant Captain Ross, for his intrepidity, sufferings, and discoveries. Mr. Marshall received a handsome remuneration for his valuable statistical tables. Mr. Gurney is at present applying for, and we hope he will obtain, a Parliamentary grant for resolving the important problem, that steam carriages can travel on common roads. Now Mr. Kemp's discovery, if it supports the character he has given of it, and experience alone can determine that, will be more deserving of a Parliamentary reward than any of these meritorious individuals, because it will be vastly more beneficial to the nation than any of these circumstances enumerated, important as they all are in their respective spheres. But should Parliament purposely neglect the claims of Mr. Kemp, from the landed interest "verily he shall have his reward."

EXTRACTS FROM PRIVATE CORRESPONDENCE.

Hanover, September 16, 1834.

I have carried out very little marl yet, only eight or ten loads, from a poor bed which I could get at conveniently. I have had so much ditching and fencing, as to be kept from improving, which I shall have a good chance for, if I can get time to open a bed or two of marl, with more shells than the one above, which I am very sure I have. The fencing is a terrible drawback—I have just paid my state and county taxes, which I regard less by far. A carpenter passed through one of my fences lately, and observed, "if he had one of the rails at his house it would be worth twenty-five cents;" it was a large white oak from the but cut; if he had looked a little closer, he would have found maple and ash used for the same purpose—if we had saw mills convenient, it might be better to use plank. I am turning out the poorest of my corn ground to grow up in pines to help out—it is possible that my case may be harder than common, but many must be getting very sensitive on this subject.

—

Brunswick, October 1, 1834.

Could you not notice the road law in your publication? If you can, you ought to tell the people that it is an extreme hardship, that a poor man who has no use for a road, and can do all of his travelling and carrying through a piney old field, as well as over a road thirty feet wide—who has but one negro, and not a soul at home to get a stick of wood for his wife and children, should be

compelled to labor on the road for the rich mans' use, whilst the rich man is attending to his own business, or pursuing his own pleasure. It is about the only case in our country in which taxation is not proportioned to property.

[The road law, and its execution, are obnoxious to more and heavier charges than that brought by our correspondent. The subject is important, and its discussion will produce much benefit, as soon as it appears that our legislators are disposed to remove any of the useless yet heavy burdens which now press upon agriculture.]

—

Amherst, 13th October, 1834.

Our crops of corn and tobacco (the latter our staple) are better than usual, and all safely housed from frost.

—

Buckingham, October 14th, 1834.

* * * * So soon, however, as I fix upon a place of location, I shall avail myself of the valuable information afforded by your excellent journal. I conceive that no man, however limited his agricultural operations may be, should deprive himself of the pleasure of reading, and the instruction thereby gained in relation to the best methods of cultivating the earth, for the consideration of the small sum of $5. I am well convinced that the Register has imparted new vigor to the system of improvement, in every section where it is taken. The steril fields are already beginning to show marks of reviving fertility, and the abominable system, so long practiced, of ploughing up and down hills, is gradually giving way. It gives me much pleasure to find that the Register, so far from decreasing in interesting and valuable communications, as was anticipated by many, who ought to have known something of the extent of the subjects on which it treats, evidently sustains its reputation, by gradually improving.

—

Tuscaloosa, Alabama.

Our crops of cotton some six weeks since were very promising, more so than I ever saw them; but from the drought, and an insect that cuts off the squares and perforates the half grown bolls, our crops will be very much shortened in my section of the state.

—

October 7th, 1834.

* * * * * tenders his warmest salutations to his respected friend, and hopes that his work is well supported and his zeal unabated. To keep up a given projectile force is not easy. I do all I can for you—but ten will borrow my numbers of the Farmers' Register, for one that will subscribe. Success must await you.

[The fact stated by our correspondent above is not peculiar to his county, for we have had similar reports, and almost in the same words, from others. However, it is gratifying to receive even this kind of attention—for next to having the Farmers' Register *bought and read*, it is most pleasing to us that it should be *borrowed and read*. But if our friends the borrowers, would consider that the whole subscription price of the work amounts not quite to 10 cents a week, they would find that it is almost as cheap to *buy* and retain, as to *borrow* and return the numbers.]

DEATH OF THE MULE'S COLT.

To the Editor of the Farmers' Register.

* * * * As the birth of the phenomenon, *my mule colt*, was recorded in your Register, so I will, with your permission, record his death, that the learned may speculate upon it. He was born, as I informed you, and as will be seen in your Register of May or June 1834, on the 23d of April 1834; and died on the 20th of October 1834, at night. The particulars are as follows: on Friday evening late, I was informed that the mule colt was sick: upon examining him I thought he had the staggers. He was freely bled, and put in a lot and went to eating fodder; it was now dark, and I determined that in the morning I would commence blistering, purging, and the use of injections, which I have never known to fail if taken in time—but in the morning he had the lock jaw, and so nothing could be done effectually for him, and he died on the Monday night following. He was weaned, and running in a good pasture with a horse colt, also just weaned, which is doing well. Now was it the staggers, or what disease? Or was ever a colt delivered of a mule known to live? I should have been much pleased to raise it, and to have known if it could continue its species.

JOHN T. KILBY.

Nansemond, 22d October, 1834.

FENCING—MARLING.

To the Editor of the Farmers' Register.

* * * * I will not let slip this opportunity of expressing my gratification that the grievous tax imposed on us by our fence law is becoming the frequent subject of animadversion in the Register, but it is still doubtful if half the evils and difficulties brought on us by the destruction of our timber, quarrels among neighbors, and the employment of our hands and teams so long, have been sufficiently pointed out. Cannot some of your correspondents who are competent to the task be induced to undertake this? Every year is adding to the evils we are laboring under, which I feel warranted in saying are already formidable, and in some cases almost intolerable.

I have the pleasure of informing you that most decided benefit has resulted from the use of marl in this county, particularly on Mr. Sutton's farm near the court house. In a few cases I have heard of a supposed damage from the use of the earth lying above the shells, having impressions only of the shells; from the very little carried out by myself I thought I saw an improvement in the corn.

Although it may be considered somewhat out of season, as the next harvest is so distant, I beg leave to make a short statement on another subject. It has been three years since we have made use of spirits in harvest, having substituted molasses with a small quantity of vinegar (cider would probably be better)—in that time I can recollect but one case in which a cutter was obliged to stop from indisposition, and in that one, the man lost only a

day and a half, and withal was not used to working in the sun: he probably used the molasses too freely. I am induced therefore to believe that experience so far justifies this change, and would, with deference, recommend it to others, especially as it was rather common for our mowers to complain and "lay up" about the winding up, or very soon after harvest, when we used spirits.

C.

Hanover, Sept. 16, 1834.

P. S. I have been told that many of the hogs in this neighborhood have died in the course of the summer—those who turned their hogs out have probably suffered most; one of my neighbors who did so has lost about half her stock.

THE MOUNTAIN REGION OF VIRGINIA.

Fairfax County, Oct. 1*st*, 1834.

To the Editor of the Farmers' Register.

I have lately returned from visiting some of the watering places over the mountains, and as I am watchful of every thing in which the great interest of agriculture is concerned, I will give you and your readers a short sketch of what I could see from my carriage window. I saw nothing worthy of notice until I reached the farm of Charles Calvert Stewart, Esq. This is situated in the red sandstone district, the most improved and improvable part of Fairfax county. The harvested crops appeared to be abundant—the crop of corn, then in full shoot and silk, was strikingly so. Fourteen miles farther on we entered the hills, or mountain country. I wish sir, I had descriptive powers to give you a "bird's eye" view of this delightful country, which is surely destined to be the pride and boast of Virginia. Broken down in health and vision, in the fulness of my heart, imagination mingled in the vegetable and animal joy around me. Pleasant are thy high places, and green thy mountains, O Virginia. And yet sir, 40 years ago this very land was a heavy article at 20 shillings per acre. Broken, and gullied, it seemed the home of misery: and now from the use of good ploughs, clover, and plaster, it is the home of plenty. Hundreds of fat cattle bellow around the hills. May I ask why this whole land cannot do the same? Will the good people of Virginia shrink from that duty which makes them rich, and their State respectable? We know that they would readily meet and make a president for this whole union—yet I much doubt if they would meet and say that the law should protect every man and his property—I mean, sir, his land. As for the horse he requires no five foot fence "so close and strong that the tresspasser cannot *creep* through" and as for money, or old clothes, they have no need of a strong five foot chest—it is poor mother earth that must be persecuted, defaced and desolated. When the "blast of war" is blown to what description of property do we look to support it? Mainly, sir, to this very unprotected outlawed land.

Upon passing the mountain you reach a country created out of very different materials and evidently for a different purpose. It is limestone base, with sometimes a thick and then a thin covering. No better land could be found for the production of small grain. The cultivators evidently depend upon the known powers of their land, and tax it extravagantly. This practice will be corrected by the division of property. To speak generally, this Valley is unskilfully cultivated—yet I often heard of $60 per acre for land. The drought has been very severe and the crop of corn with some exceptions bad. A Chinese mandarin with *full powers* would soon make the land of this Valley worth $100 per acre.

JEREMIAH.

For the Farmers' Register.

AN IMPROVED METHOD OF SEEDING BEDDED LAND IN WHEAT.

Instead of sowing (as is usual) a single bed at once, sow from the centre of one bed to the centre of the other, by which means you will have your wheat thickest on the top of your bed—whereas by the old plan it is almost always thickest in the water furrow, where it is sure to be lost if the land is low and wet.

T. G. B.

From the Southern Religious Telegraph.

HAMPDEN SYDNEY COLLEGE.

The commencement at this Institution took place on the 24th September last. The order of exercises was as follows.

I. *An Oration*—On the advantage or pleasures of reflection—*Goodridge A. Wilson*, Prince Edward.

II. *An Oration*—On the importance of variety of knowledge, with some incentives to literary exertion.—*John T. Harris*, Cumberland.

III. *An Oration*—On some of the peculiar traits in American history.—*Anthony Thornton*, Cumberland.

IV. *The Cliosophic Oration*—Milton and Byron—their comparative excellencies.—*Francis B. Watkins*, Goochland.

V. *An Oration*—On the importance of ascertaining the proper limits of the human mind and the objects to which it should be directed.—*Henry E. Madison*, Prince Edward.

VI. *The Philosophical Oration*—Progress and prospects of society.—*Robert B. White*, Winchester.

VII. *Master's Oration*—Alexander Scott.

VIII. *Master's Oration*—Thomas S. Flournoy.

IX. *Degrees conferred.*

X. *An Oration*—On the duty of American scholars as citizens of the republic—with the valedictory addresses.—*James H. Morrison*, Lunenburg.

The degree of Bachelor of Arts was conferred on John T. Harris, H. E. Madison, Jas. H. Morrison, Anthony Thornton, Francis B. Watkins, R. B. White, and G. A. Wilson.

On Thursday the 25th, the Institute of Education held its second anniversary meeting, when it was addressed in a highly interesting and able manner by James M. Garnett, Esq. of Essex, on the advantages of Literary Associations.

Form the Louisiana Register.

CORN.

Mr. Editor:—As the season is now approaching when farmers will commence gathering corn crops, I deem it my duty, (as a farmer,) to inform them, through the medium of your paper, how to

secure their corn from the ravages of the weevil; which often during the summer and fall seasons, entirely destroys whole houses of corn. As the remedy is so simple, and so cheap, I am in hopes no farmer will leave it untried. It is simply this.—When hauling in a crop of corn, have a mixture of salt and water prepared, (say one pint of salt to a gallon of water,) and as each load is thrown into the house, sprinkle it thoroughly with the salt and water; and it will entirely prevent the insect from breeding in the corn, and likewise cause the husks to be more palatable for stock of any kind. As I know this from experience, I feel no doubt in recommending it to others.

A FARMER.

For the Farmers' Register.

COMMERCIAL REPORT.

[An apology is due to our correspondent X, and to our readers, for the omission of his report for September—which was caused by its arriving after the last sheet had been printed.]

The commercial transactions in Virginia during the month of September, were to a very moderate extent, and those of October have not been as large as usual, the cause of which will appear in the sequel.

The crop of wheat has proved to be so small, that the mills have not been in full operation, except those in Richmond, where a large supply was secured by early contracts. The price has been better supported in Virginia than in other markets, and has not varied materially, the current rates of fair and good quality being from 100 to 105 cents per bushel. The demand for flour for foreign export is confined to South America and the West Indies, and has not been very extensive. The price of grain in all European countries, is unusually low, and the crops in Great Britain are reported to be large and fine—no demand can therefore be expected from that quarter. The stocks of flour in the markets of this State, other than Richmond, are inconsiderable, nor is it likely that they will accumulate. The price of country flour is $4 75 to $5, and of Richmond City Mills $6 25. The supplies to New York from the western parts of that State and the shores of Lake Erie, are very large, and they are annually increasing, with the increased cultivation in, and facilities of transportation from Ohio, Indiana, Illinois, and Michigan, which are becoming the most extensive granaries in America.

The crop of tobacco inspected in Virginia during the year ending 1st October, is ascertained to have been 20,640 hhds. passed.
14,860 refused,
and the stock remaining on hand at that period, was 10,600, showing very little variation in the quantity produced in each of the last three years, but a considerable diminution in the quantity manufactured at home. The export to foreign ports was 15,170 hhds. to Great Britain,
3,530 to France,
6,860 to other markets, chiefly in the north of Europe, being an increase in the foreign export beyond that of the preceding year, of 5000 hhds. The price has been steady, say from $4 75 for the most inferior, to $9 and $10 for fine qualities for exportation. The crop of the present year's growth it is supposed will prove to be somewhat larger in quantity than the last, and not so good in quality. The quantity of tobacco received at New Orleans (a description which comes in competition with that of Virginia) was 25,000 hhds. being 3,500 hhds. more than in the preceding year, and 5000 less than in 1832.

The crop received at New Orleans, was thus disposed of:

To Great Britain, - -	3300
— out ports for orders, - -	4800
— France, - - -	300
— north of Europe, - -	4600
— south of Europe, - -	950
— West Indies, - - -	550
— ports in the United States,	10500

The crop of cotton brought to the Virginia markets during the year ending the 1st inst. was 44,700 bales, of which about 35,000 were received at Petersburg. There was exported to Europe, 31,000, to northern ports in the United States 7,500, and 6,000 bales were manufactured in Virginia, as nearly as can be estimated. The crop of the United States which was brought to market during the last twelve months, is ascertained to have been 1,205,400 bales, of which
756,300 were exported to Great Britain,
216,220 to France,
42,760 to the north of Europe,
12,150 to other ports, making a total of 1,027,430 bales, being 160,000 more than were exported the preceding year, and showing an increase of 135,000 bales in the quantity brought to market. It appears, however, that the quantity manufactured in Europe also increases annually, and that the supply from other countries than this, has rather diminished. It appears that 196,000 bales were manufactured in the United States during the twelve months. The crop produced this year is by many intelligent persons estimated to be even larger than the last, for although an unfavorable season has injured the quality, and diminished the product in the Atlantic States, the great emigration to the south west, and the annual increase of cultivation, more than compensates for a deficiency in the productiveness of any portion of the widely extended territory, of which cotton is the chief staple, and by which the planters are rapidly enriched. The price of the new crop opened at 14 cents in Petersburg and Norfolk, and at about the same in southern markets. It has since advanced to 14¾ cents for the best quality, in consequence of reported injury to the Southern and Western crops. The current prices in Petersburg, are from 13¾ to 14¾. Compared with last year's crop it is much later, and the quality not so good. Very little has yet been brought to our markets: by the 1st of November last year, one-fifth of the crop had arrived.

There has been no pressure for money during the past two months, and little business done in which to employ it, except by dealers in stocks. An advance has taken place in almost all descriptions of State loans and Bank stocks, which may, as regards the former, be ascribed to the rate of exchange on England, where such stock is ultimately sold. The Commonwealth obtained 107 for a loan at 5 per cent. Virginia Bank Stock sells at 110—Farmer's Bank at 108—Exchange on England 107½, being about the relative mint value of gold in the respective countries, when

the pound sterling is estimated at $4 44, and taking into consideration the loss of interest on bills, an advance of 1½ or 2 per cent. would probably cause an exportation of silver from this country, and a decline would induce an importation of gold.

X.

October 25, 1834.

SERPENTS IN SOUTH AMERICA.

From Humboldt's Travels.

In the savannahs of Izacubo, in Guiana I saw the most terrible spectable that can be seen; and although it be not uncommon to the inhabitants no traveller has ever mentioned it. We were ten men on horseback, two of whom took the lead, in order to skirt the great forests. One of the blacks who formed the van guard, returned full gallop, "Here sir, come and see serpents in a pile." He pointed out to me something elevated in the middle of the savannah or swamp, which appeared like a bundle of arms. One of my company then said, "This is certainly one of the assemblages of serpents, which heap themselves on each other after a violent tempest; I have heard of these, but have never seen any; let us proceed cautiously, and not go too near."—We continued our way slowly; I fixed my eyes on the pyramid, which appeared immovable. When we were within twenty paces, the terror of our horses prevented our nearer approach, to which however none of us were inclined.

On a sudden the pyramidal mass became agitated, horrible hissings issued from it, and thousands of serpents rolled spirally on each other, shot forth out of the circle; their hideous heads, presented their envenomed darts to me. I own I was one of the first to draw back; but when I saw this formidable phalanx remained at its post, and more to defend itself than to attack us, I rode round it in order to view its order for battle, which faced the enemy from every side. I then sought to find what could be the design of this numerous assemblage; and I concluded that this species of serpent dreaded some colossean enemy, which might be the great serpents, or the cayman, and that they reunite themselves afer having seen this enemy, in order to attack or resist him in mass. On this occasion, I shall hazard an opinion which I founded on several other observations; it is that the animals in the new world are more advanced than the men in developing their instinct, and in the social combinations of which they are susceptible; the silence and the solitudes of the woods leaving the greatest liberty to all their motions, the individuals of the same species easily meet and species which are best organized, feel without the impulsion of a common interest which announces and provokes to the same end the concurrence of all their means; but after having acknowledged in animals different degrees of intelligence, such as memory, deliberation, will, we are reduced to mere conjecture as to their means of communication. It is certain, that those which possess the organs of voice have cries of alarm, of rallying, of love, of anger, and may they not also have those requisite to combine in their chases, to distribute the post of attack and defence, the different labors of their common construction, as well as for supplying their common habitations with necessaries.

SHORT-HORN BULL NULLIFIER.

Messrs. D. Galt and H. Edloe, have lately received from England, a fine young bull of the improved short-horn breed. *Nullifier* will be kept in or near Williamsburg: and if he lives, it may be confidently anticipated, that he will prove highly profitable to his owners, and ultimately to the breeders of cattle through that region. No other part of Virginia, east of the Blue Ridge, is better suited for profitable grazing, or more requires a good breed of cattle.

TO CORRESPONDENTS.

The following communications have been received. "On cheat and wheat"—"Gama grass"—"The time to cut tobacco"—"Influence of the moon on vegetation"—"The fence law"—"On the 'cheat controversy' "—"The pleasures of agricultural pursuits"—"Queries &c. by *A Lover of Husbandry*"—"On the food or nutriment of plants"—As the last piece is "to be continued," it is respectfully suggested to its unknown author, that it will be best to send the concluding portion, so that all may appear together. We dislike destroying the connexion of any communication by giving it in detached portions, and never have divided any, unless when the subject properly admitted of it. Besides, it is necessary in most cases that we should see, and have possession of the continuation of an article, before it is promised to our readers. These remarks are applicable generally, as well as to the particular communication which has elicited them.

Several communications "On the season and state of crops" have been received at different times, just after the last sheet of the number was ready for the press, and have been afterwards omitted, because the delay of another month had deprived such reports of their intended use of conveying *news*. This will of necessity often occur, when such reports arrive after the 25th of the month.

☞ A short communication from a correspondent in Amelia, is not sufficiently plain in the directions contained to be understood. A more full statement will be acceptable, and will be published when received.

A letter of inquiry relating to Herd's grass, &c. the receipt of which was acknowledged in the last No. has been mislaid, and its publication thereby prevented. If the writer had not omitted to give his name and address, we should in a more private manner than this, have tendered our apology, and requested another copy for publication.

TO SUBSCRIBERS, AND TO APPLICANTS FOR AGENCIES.

☞ No person is authorized as agent for the Farmers' Register, nor will there be, without previous notice being published on the covers. The punctuality of the large majority of our subscribers, so far, has rendered it unnecessary for the great trouble and expense of collecting agencies to be incurred.

Printed by Robert Ricketts,

AT THE SHELLBANKS PRESS,

Prince George County, Va.